COMPAQ

ProLiant 8500 Servers

Setup and Installation Guide

First Edition (May 1999)
Part Number 323333-001
Compaq Computer Corporation

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About This Guide

This Setup and Installation Guide can be used for step-by-step instructions for installation, and as a reference for operation, troubleshooting, and future upgrades for Compaq ProLiant 8500 Servers.

WARNING: To reduce the risk of personal injury from electrical shock and hazardous energy levels, only authorized service technicians should attempt to repair this equipment. Improper repairs could create conditions that are hazardous.

IMPORTANT: The installation of options and servicing of this product shall be performed by individuals who are knowledgeable of the procedures, precautions, and hazards associated with equipment containing hazardous energy circuits.

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Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.

WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.

CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents clarifying information or specific instructions.

NOTE: Text set off in this manner presents commentary, sidelights, or interesting points of information.

Symbols on Equipment

These icons may be located on equipment in areas where hazardous conditions may exist.

Any surface or area of the equipment marked with these symbols indicates the presence of electrical shock hazards. Enclosed area contains no operator serviceable parts.

WARNING: To reduce the risk of injury from electrical shock hazards, do not open this enclosure.

Any RJ-45 receptacle marked with these symbols indicates a Network Interface Connection.

WARNING: To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

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Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching.

50.5 kg
111 lb

Any product or assembly marked with these symbols indicates that the component exceeds the recommended weight for one individual to handle safely.

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local Occupational Safety requirements and guidelines for heavy equipment handling.

Power Supplies or Systems marked with these symbols indicate the equipment is supplied by multiple sources of power.

WARNING: To reduce the risk of injury from electrical shock, remove all power cords to completely disconnect power from the system.

Compaq Technician Notes

WARNING: Only authorized technicians trained by Compaq should attempt to repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard. Any indications of component replacement or printed wiring board modifications may void any warranty.

WARNING: To reduce the risk of personal injury from electrical shock and hazardous energy levels, do not exceed the level of repair specified in these procedures. Because of the complexity of the individual boards and subassemblies, do not attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs could create conditions that are hazardous.

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WARNING: To reduce the risk of electric shock or damage to the equipment:

- If the system has multiple power supplies, disconnect power from the system by unplugging all power cords from the power supplies.
- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.

CAUTION: To properly ventilate your system, you must provide at least 12 inches (30.5 cm) of clearance at the front and back of the computer.

CAUTION: The computer is designed to be electrically grounded. To ensure proper operation, plug the AC power cord into a properly grounded AC outlet only.

Where to Go for Additional Help

In addition to this guide, the following information sources are available:

- User Documentation
- *Compaq Service Quick Reference Guide*
- Service Training Guides
- Compaq Service Advisories and Bulletins
- Compaq QuickFind
- Compaq Insight Manager
- Compaq Download Facility: Call 1-281-518-1418

Integrated Management Display

Some Compaq server models include a Compaq Integrated Management Display (IMD), an integrated, 16x4 character display mounted on the front of the server. This display provides easy-to-use menu-driven access to server information, including model number, LCD firmware revision, and POST operations.

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Telephone Numbers

For the name of your nearest Compaq Authorized Reseller:

- In the United States, call 1-800-345-1518
- In Canada, call 1-800-263-5868
- For Compaq technical support:
- In the United States and Canada, call 1-800-386-2172
- For Compaq technical support phone numbers outside the United States and Canada, visit the Compaq website at:
  http://www.compaq.com

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Chapter 1

Introduction

Compaq ProLiant 8500 Servers

The Compaq ProLiant 8500, the ultimate high-density data center server, delivers breakthrough 8-way scalable performance for 24x7 multi-server rack environments. The ProLiant 8500, which is based on the ProFusion 8-way architecture, delivers this performance through state-of-the-art Intel Pentium III Xeon processor technology, breakthrough scalable performance of I/O and memory, and the highest levels of fault tolerance and manageability for the data center.

Performance is maximized with up to eight Pentium III Xeon processors and sixteen Gigabytes (GB) of ECC SDRAM memory. Input/output (I/O) performance is further enhanced by eleven 64-bit PCI slot - two of those slots operating at 66MHz, a Integrated Smart Array Controller (Ultra2 support), and Wide Ultra2 SCSI hard drives.

High-availability features include: PCI Hot Plug slots, redundant hot-pluggable power supplies, redundant hot-pluggable fans, redundant processor power modules, redundant network interface controllers (NIC), Smart Array 4200 controllers, Error Checking and Correcting (ECC) memory, Disk System Tracking, Disk Drive Fault Tolerance, and Automatic Server Recovery-ASR2.

Server management and configuration tools important to availability include SmartStart, Remote-Flash-Redundant-ROM, System Interconnect Status Indicators, Compaq Insight Manager, Compaq Remote Insight, Compaq Server Utility, and Integrated Remote Console (IRC).

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In Compaq ProLiant 8500 servers, you can access options and accessories easily through a sliding top access panel and three removable modules: the Processor and Memory module, the Media module, and the I/O Module. See Figures 2-1 and 2-2 for identification of these modules and other components.

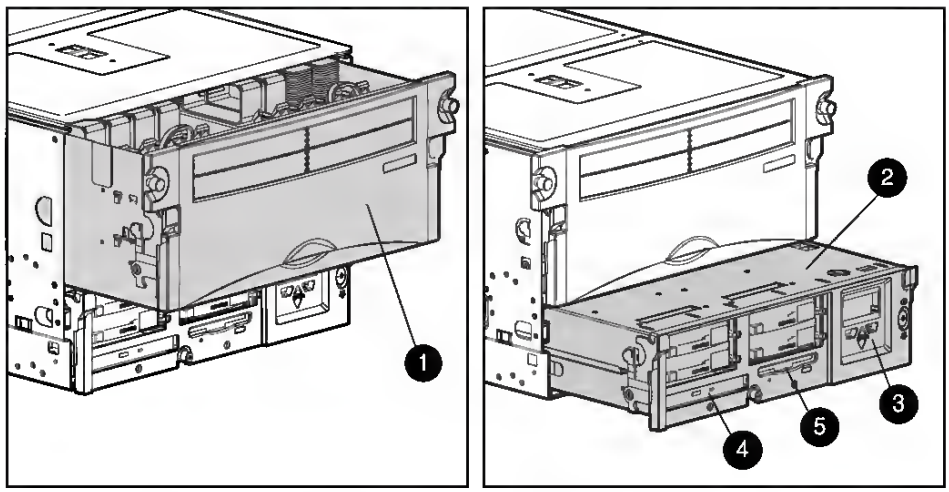

Figure 1-1. Compaq ProLiant 8500 Server - front view

❶ Processor and Memory module

❷ Media module

❸ Integrated Management Display (IMD) (on some models)

❹ IDE CD ROM

❺ 1.44 MB Diskette Drive

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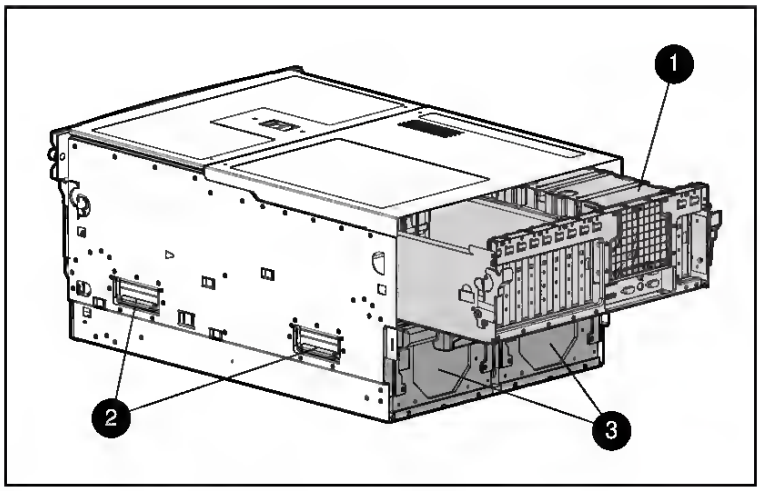

Figure 1-2. Compaq ProLiant 8500 Server - rear view

❶ I/O module with system fans

❷ Integrated Server Lift Handles

❸ Hot Plug Power Supplies

Features

The following features are available on Compaq ProLiant 8500 models:

Processor and Redundant Processor Power Modules

- Supports up to eight Pentium III Xeon processors
  - Thermal plate attached to the processor
- Supports up to eight Processor Power Modules plus one power module for processor bus termination.
  - Redundant Failover Support on some models

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System Memory

- ECC (Error Checking and Correcting Memory) with single-bit error correction and detection to a single DIMM, and multi-bit error detection to the memory bank
- Supports 100 MHz Registered SDRAM
- Expandable to 8 GB (16 GB when 16 x 1-GB DIMMs are available)
- Supports up to eight memory banks with each bank consisting of two DIMMs. One bank is installed or removed at a time. Each DIMM of a given bank must be of the same size, type, and speed.

Cache Accelerator

- Increases system performance for 2 to 4 processors
- Required for more than 4 processors or if processors are installed on both processor buses

Expansion Slots

Eleven I/O expansion slots

- Nine 33-MHz, 64-bit PCI Hot Plug slots (PCI Buses 1 and 2)
- Two 66-MHz, 64-bit PCI Hot Plug slots (PCI Bus 3)

PCI Hot Plug

PCI Hot Plug provides the ability to remove, replace, upgrade, and add PCI expansion boards without powering down the server. Any PCI board can be placed in a PCI Hot Plug slot. PCI Hot Plug device drivers and OS support, however, are required to enable PCI Hot Plug.

The PCI Hot Plug button allows for PCI Hot Plug access directly at each PCI slot. A PCI Hot Plug button is located above each PCI slot, providing PCI Hot Plug control directly at the server without the use of the PCI Hot Plug utility software.

For more information about PCI Hot Plug, refer to the Systems Reference Library CD included in the Reference Information pack.

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Redundant Hot Plug Fan

ProLiant 8500 servers include a redundant hot-plug system fan. If the primary fan fails, it generates a system alert and triggers the secondary (or redundant) fan to take over automatically. The redundant hot-plug system fan protects the various server components from overheating and possible system interruption.

Internal Hot Plug Drive Bays

- Supports four, 1-inch, Wide Ultra2 SCSI hard drives
- Drives may be of any storage capacity, but must be mounted on Compaq hot-plug drive trays.
- Internal drives are controlled by a Dual Channel Integrated Smart Array Controller. See Chapter 5, "SCSI Setup" for a description of the integrated controller.

Fixed Internal Media Drive Bays

- Supports two non-hot-plug media drive bays:
  - One third-height drive bay occupied by 1.44-MB diskette drive
  - One third-height drive bay occupied by IDE CD-ROM drive

Disk Controllers

The Compaq ProLiant 8500 server is provided with an Dual Channel Integrated Smart Array Controller. This controller provides two Wide Ultra2 SCSI controllers. One controller is dedicated to the internal drive bay. The other controller is connected to the external SCSI connector. See Chapter 5, "SCSI Setup" for descriptions of the features and array set-up procedures for these controllers.

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Network Controller

- Supports a dual-port 10/100 TX UTP controller on the PCI local bus (on some models). Features of the controller include two RJ-45 connectors for 10BaseT or 100TX Ethernet. For information about the network controller, refer to the Compaq Web Site at www.compaq.com.
  - Redundant Network Controller software, located on the Compaq Support Software CD, supports a redundant NIC configuration. This feature may be used with one dual-port, two dual-port, or two single-port NICs.

NOTE: Remove the terminator plug from the second RJ-45 connector when using the dual-port capabilities.

Supported Interfaces

- Wide Ultra2 SCSI (Very High Density Connector Interface connector)
- Serial (two connectors)
- Video
- Parallel port
- Keyboard
- Mouse

Video

- Integrated PCI Video Controller provides maximum resolution of 1024 x 768 non-interlaced resolution with 2 MB memory
- From 16 to more than 256 colors, depending on graphics mode
- Supports SVGA, VGA, and EGA graphics resolution

Service Improvement Features

- Modular chassis
- System Interconnect Status Indicators visible from exterior

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Power Supplies

- Supports two hot-plug, redundant power supplies.
- Power supplies are load-balancing and have microcontroller monitoring for advanced health and configuration management.
- Supports two power supplies. Depending upon the system load configuration, more than one power supply may be required to power the system. See Table 1-1, "Power Supply Support Provided for System Configurations," to determine power supply requirements.

Refer to the table below to determine the number of power supplies needed for your server.

Table 1-1
Power Supply Support Provided for System Configurations

Power Supplies	Power LineType	Processors	Hard Drives	Memory	PCI Expansion Cards
1	110	1 to 4	4	256MB to 4GB	3 to 5
1	220	1 to 8	4	256MB to 8GB	4 to 9
2	110	1 to 8	4	256MB to 8GB	4 to 8
2	220	1 to 8	4	256MB to 8GB	1 to 11

Note: This table assumes worst case power loading from all components simultaneously for worst case temperature and input power conditions. Actual performance may vary depending on server application.

Power supply advanced features include:

- Auto Line Sensing capability; no switch is needed to select the appropriate line voltage.
- Power Supply Viewer Utility under Microsoft Windows NT
- Power Down Manager Utility under Microsoft Windows NT
- Power Supply Utility under NetWare

The utilities are provided on the Compaq Support Software for Microsoft Windows NT 4.0 diskettes (NTSSD). For more detailed information, refer to the NTREADME.HLP file on Diskette 1.

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System Power Management Guidelines

Unless operating with two 1150W power supplies at 220V, it may be necessary to make tradeoffs with respect to which options can be added and powered with the installed power supplies. Use the following guidelines when evaluating these tradeoffs.

NOTE: The following guidelines are general. Use the Windows NT Power Supply Viewer Utility and option documentation to obtain the most accurate power capacity and assessment of power margin.

- Comparing processor and hard drive power: two processors draw as much current as five to six hard drives.
- Comparing memory and 3.3V-powered PCI Expansion Board power: each additional 512MB draws approximately as much current as one to two PCI boards.
- Comparing hard drive and 5V-powered PCI Expansion Board Power: one PCI card draws as much current as two to five hard drives.
- In general, PCI array controllers draw more current than PCI NICs.
- For example, if the available capacity of the installed power supplies permits adding two processors, you have the option of adding:
  - two processors,
  - one processor and three hard drives, or
  - up to four hard drives

Remote-Flash Redundant ROM

This server is equipped with a Remote-Flash Redundant ROM that gives the system the ability to recover the last known good system ROM in the event that the current system ROM has been corrupted. When the server leaves the factory both system ROMs will contain the same image. Through subsequent boots of the server, if any integrity errors are detected by the boot block then the system will automatically launch the redundant image and continue the POST process.

If this occurs, you will see a "105" error message saying which system ROM had been deemed faulty. The ROMPaq utility will flash the failed system ROM to the latest released version.

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During the flash process, the ROMPaq driver will automatically detect which system ROM is inactive and flash that system ROM with the image obtained from the ROMPaq diskette. Once the flash process is completed the server now contains a fully redundant system ROM.

NOTE: If you are familiar with the process of flashing a Compaq server via the ROMPaq utility there are no noticeable changes to the ROMPaq user interface. This feature is implemented in the ROMPaq driver and the system boot block only. User configuration of this feature is not required.

Warranty

- Three-Year Parts, Labor, and On-Site Limited Warranty
- Pre-failure warranty on processors, memory, and hard drives
- Year 2000 Warranty
- For additional service and support offerings, visit the Compaq web site at www.compaq.com.

Major Hardware Options

The ProLiant 8500 server supports a wide range of server hardware options. Compaq server options are available from a Compaq Reseller or Authorized Service Provider. Additional information on Compaq servers and options can be found at www.compaq.com.

Hardware options installation instructions can be found inside each hardware option kit. This guide also provides basic installation instructions for the following server options:

- Redundant hot-plug power supplies
- Pentium III Xeon processors
- Redundant processor power modules
- Cache Accelerator
- SDRAM memory
- Hot-plug hard drives
- I/O expansion boards (including PCI expansion boards with PCI Hot Plug driver support)
- Integrated Array Bypass kit

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Server Configuration and Management

Compaq offers an extensive set of features and tools to support effective server configuration and management. Some are listed below:

- Compaq SmartStart
- Compaq System Configuration Utility
- Compaq Remote-Flash ROM
- Compaq ROM Default Configuration
- Compaq Online ROM Flash
- Compaq Insight Manager
- Compaq Integrated Management Log
- Compaq Integrated Remote Console
- Compaq Integrated Management Display

Compaq SmartStart

SmartStart, which is located on the SmartStart and Support Software CD, is the intelligent way to configure your Compaq server with Microsoft, Novell, and SCO system software. SmartStart uses a step-by-step process to configure the server and to load the system software, thereby achieving a well-integrated server to ensure maximum dependability and supportability. The SmartStart and Support Software CD also holds the Compaq System Configuration Utility.

For information about SmartStart, refer to the Server Setup and Management pack included in the shipping box.

Compaq System Configuration Utility

The Compaq System Configuration Utility performs a wide range of configuration activities, including the following:

- Configures I/O expansion boards automatically
- Provides switch and jumper settings
- Resolves resource conflicts in areas such as memory, port addresses, and interrupts (IRQs)

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- Manages storage devices such as hard drives and tape drives
- Stores configuration information in nonvolatile memory
- Assists in the running of software and firmware diagnostics tools such as SURVEY, Diagnostics (DIAGS), Array Configuration Utility (ACU), ROMPaq, and Automatic Server Recovery (ASR-2)

The first time the server is configured, the SmartStart program automatically creates a system partition, and installs the configuration utility and other Compaq utilities in that partition.

Windows NT Utilities

Compaq servers running Windows NT take advantage of several utilities that provide detailed information and offer special capabilities.

- Compaq Power Down Manager
- Compaq Power Supply Viewer
- Compaq Integrated Management Log Viewer

The utilities are provided on the Compaq Support Software for Microsoft Windows NT 4.0 diskettes (NTSSD). For more detailed information, refer to the Systems Reference Library and the NTREADME.HLP file on Diskette 1.

NetWare Utilities

Compaq servers running Windows NT take advantage of several utilities.

- Power Supply Utility
- IML Log Viewer

These utilities are located on the NSSD CD.

Compaq Insight Manager

Compaq Insight Manager is the Compaq application for easily managing network desktops and servers. Compaq Insight Manager delivers intelligent monitoring and alerting as well as visual control of your Compaq servers and desktops. In the unlikely event of hardware failures, Compaq Insight Manager also provides a full complement of remote maintenance and control facilities.

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Compaq Web-Based Management

Compaq Web-Based Management allows you to access your managed Device List and the Compaq Insight Manager Alarm Log with a web browser, either locally at the management console or from another machine. If you have devices that are running Compaq Insight Management Agents v4.x, you can also view the device data using a browser.

Two buttons have been added to the button bar in Compaq Insight Manager. One button launches your browser with the Device List displayed, the other button launches your browser with the Alarm Log displayed.

For Web-enabled devices (devices that are running Compaq Insight Management Agents v4.x), a task will also appear in the Task List for viewing web data. Right click on the device in the Compaq Insight Manager Device List to display a device specific menu and open the Task List, or, directly select View Web Data. When you select the View Web Data task, the browser is launched with data for that device displayed.

Compaq Integrated Management Log

The Compaq Integrated Management Log (IML) records events and stores them in an easily viewable form. The IML records hundreds of events and then marks each event with a time stamp. For more information about the IML, see Chapter 7, "Integrated Management Log."

Compaq Integrated Remote Console

The Compaq Integrated Remote Console (IRC) is a hardware-based remote console solution for enhanced out-of-band remote server manageability. It requires an external modem connected to a serial port. The IRC features include:

- Operating system independent
- Remote server reboot
- Reset and failure sequence replay
- Out-of-band communication

For information about the Integrated Remote Console, refer to the *Compaq Integrated Remote Console User Guide.*

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Compaq Integrated Management Display

The Integrated Management Display (IMD) is a server management tool delivering fault, service, and configuration capabilities in an easy-to-use, integrated hardware display. IMD features include:

- POST (Power-On Self-Test) messages
- User-defined administrative information
- Configuration information
- System alerts and event description

For information about the Integrated Management Display, see Chapter 7, "Integrated Management Log."

Security

For detailed information about security features, refer to the Systems Reference Library CD included in the Reference Information pack shipped with your server.

Software Security Features

These software security features are established through the Compaq System Configuration Utility.

- Administrator Password
- Diskette Drive Control
- Diskette Write Control
- Keyboard Password
- Network Server Mode
- Parallel Interface Control
- QuickLock
- Serial Interface Control

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Hardware Security Features

These hardware security features are established by a switch on the I/O board.

- Configuration Lock
- Diskette Boot Control

Service Features

Some of the software, firmware, and hardware features of the Compaq ProLiant 8500 server that facilitate serviceability include:

- Modular design
- All diagnostic LEDs viewable from the exterior
- Power-On Self-Test (POST)
- Diagnostics (DIAGS)
- ROMPaq utilities to upgrade flash ROMs
- Array Configuration Utility (ACU)
- Integrated Management Display (IMD)
- Integrated Management Log (IML)

For information about Compaq diagnostic tools, refer to the Systems Reference Library CD included in the Reference Information pack of the shipping box.

Server Registration

Registering your server provides Compaq with valuable information on server installation. This information helps Compaq serve your needs better now and in the future. Visit www.compaq.com/register to register your server.

Routine Maintenance

For information about routine maintenance and safety precautions, refer to the Systems Reference Library CD included in the Reference Information pack of the shipping carton.

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Chapter 2

Server Installation

This chapter provides the procedures required to prepare a ProLiant 8500 server to be mounted in a Compaq or industry-standard 19-inch rack, and to complete installation.

Preparing the Server

Installing the server in the rack requires the following steps (detailed later in this chapter):

1. **Select a site and unpack the server.** See the next sections, "Optimum Environment" and "Unpacking the Shipping Boxes" in this chapter.
2. **Remove the power-supply and I/O Module shipping bracket**. See the next section, "Removing the Shipping Brackets" in this chapter.
3. If required, release the top access panel latch. Slide the top access panel open, and remove the shipping screw on top of the unit.
4. **Install any expansion boards or other options such as additional memory (Optional).**

   You will need to run the System Configuration Utility after you install some hardware options, with the exception of additional memory and most PCI boards. Refer to the Server Setup and Management pack shipped with your server to run the System Configuration Utility. See Chapter 4, "Installing Hardware Options," to install many of the major options.
5. **Loosen the shipping screw between the I/O Module and the Processor and Memory module.**

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6. **Remove the Processor and Memory module, Media Module, and power supplies to lighten the chassis.**
7. **Verify switch settings: bus/core frequency switches and system configuration switch.** Refer to the *Compaq ProLiant 8500 Hardware Installation and Configuration* poster included in the shipping box or to the hood labels on the top access panel and on the sides of the Processor and Memory Module.
8. **Install the chassis in the rack and replace the modules and power supplies.**
9. **Connect the cables: keyboard, mouse, monitor, network, storage, and power.** See "Cabling the Server" later in this chapter.
10. **Turn on the computer and insert the SmartStart and Support Software CD to configure the server.** To load the CD, see Chapter 6, "Server Configuration." For the SmartStart and Support Software CD installation procedures, refer to the Server Setup and Management pack shipped with your server.
11. **Install Compaq Insight Manager to manage the server.** For the Compaq Management CD installation procedures, refer to the Server Setup and Management pack shipped with your server.
12. **Register the server**. For server registration information, refer to the Server Setup and Management pack shipped with your server.

Optimum Environment

When installing your ProLiant 8500 in a rack, the following standards must be met:

- Space
- Power
- Temperature
- Grounding

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Space Requirements

Consider the following items when deciding where to install your Compaq rack:

- Clearance in the front of the rack should be a minimum of 25 inches for servicing.
- Clearance in the back of the rack should be a minimum of 30 inches to allow for servicing and for adequate airflow.

Power Requirements

WARNING: To reduce the risk of personal injury, fire, or damage to the equipment, do not overload the AC supply branch circuit that provides power to the rack. Consult the electrical authority having jurisdiction over your facility wiring and installation requirements.

IMPORTANT: Because of the 100 to 208 VAC electrical rating of each power supply, some local electrical authorities may require either one 15-Ampere circuit for each power supply or one 20-Ampere circuit for each pair of power supplies.

- The power load needs to be balanced between available AC supply branch circuits.
- The overall system AC current load must not exceed 80 percent of the branch circuit AC current rating.
- If power strips are used, the load should not exceed 80 percent of the power strip's marked electrical current rating.

The installation of this equipment shall be in accordance with Local/Regional electrical regulations governing the installation of Information Technology Equipment by licensed electricians. This equipment is designed to operate in installations covered by the National Electric Code (ANSI/NFPA 70, 1999) and the code for Protection of Electronic Computer/Data Processing Equipment (ANSI/NFPA 75, 1999).

For electrical power ratings on options, refer to the product's rating label or user documentation supplied with that option.

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Grounding

For proper operation and safety, this equipment is required to be properly grounded in accordance with ANSI/NFPA 70-1999, Article 250. All power distribution devices, branch wiring, and receptacles must be "Listed" grounding-type devices.

Due to the higher ground leakage currents associated with the equipment, Compaq recommends the use of a Power Distribution Unit (PDU) that provides a supplementary ground conductor. This supplementary ground conductor should be permanently connected to a suitable building ground terminal. The use of common power outlet strips for this equipment is not recommended.

For proper operation and safety, this equipment is required to be properly grounded. In the United States, install the equipment in accordance with ANSI/NFPA 70 1999 (National Electric Code) Article 250, as well as any local and regional building codes. In Canada, the equipment should be installed in accordance with Canadian Standards Association, CSA C22.1, Canadian Electrical Code. In all other countries the installation should follow any regional or national electrical wiring codes such as the International Electrotechnical Commission (IEC) 364 parts 1 through 7. All power distribution devices used in the installation including branch wiring, receptacles, etc. should be Listed or Certified ground-type devices.

WARNING: To reduce the risk of electrical shock due to high leakage currents, a reliable grounded connection (earthed) is essential before connecting the unit to an AC supply.

When using power strips for electrical distribution, make sure that ground integrity is maintained for each connection made. Plug each component into a reliably grounded outlet.

Temperature Requirements

To ensure continued safe and reliable operation of the equipment, install/place the system in a well-ventilated, climate-controlled environment.

The Compaq Maximum Recommended Ambient Operating Temperature (TMRA) for most server products is 35°C (95°F). The temperature in the room where the rack is located should not exceed 35°C (95°F).

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The operating temperature inside the rack will always be higher than the room temperature, and is dependent on the configuration of equipment in your rack. The TMRA for each piece of equipment should be checked before installation. The maximum internal rack temperature for your configuration should not exceed the values shown in the following table.

Table 2-1
Rack Internal Temperature Maximums

Equipment Included	Maximum Internal Rack Temperature
Rack-Mountable ProLiant Servers	43°C/122°F
Compaq Rack-Mountable options	40°C/104°F
Other manufacturers' options	See other manufacturers' specifications

CAUTION: To reduce the risk of damage to the equipment when installing third-party options:

- Make sure that the option equipment does not impede airflow to the Rack-Mountable ProLiant Servers or increase the internal rack temperature beyond the Compaq specified maximum rating.
- Make sure that the Manufacturer's Maximum Recommended Ambient Operating Temperature of the option equipment is not exceeded when installed in the rack.

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Airflow Requirements

The Compaq ProLiant 8500 server draws cool air in through the front door and exhausts warm air out through the rear door. Therefore, the front door of the rack must be adequately ventilated to allow ambient room air to enter the cabinet, and the rear door must be ventilated adequately to allow the warm air to escape from the cabinet. Do not block the ventilation apertures.

CAUTION: If a third-party rack is used, the following minimum requirements should be observed to ensure adequate airflow and to prevent damage to the equipment:

- Front: The rack door should have 120 square inches of holes evenly distributed from top to bottom to permit adequate air flow.
- Side: The clearance between the installed module and the side panels of the rack should be a minimum of 2.75 inches.
- Rear: The clearance between the back of the rack and the wall should be a minimum of 30 inches and the equipment should be operating without a rear door.

CAUTION: If all of the vertical space in the rack is not filled by components, the gaps left will cause a change in airflow through the rack and across the components. These gaps need to be covered with blanking panels.

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Unpacking the Shipping Boxes

Unpack the shipping boxes by following the instructions and illustrations printed on the outside of the boxes. Locate the following materials:

- ProLiant 8500 Server - located inside shipping box
- Power cord(s) - located inside country kit box
- Documentation inside the server (Most of the option installation and setup instructions are located on hood labels on top of the unit and on the sides of the Processor and Memory module.)
- Hardware documentation and software packs inside the country kit: Server Setup and Management, Reference Information, and Software Products

In addition to these supplied items, you may need:

- T-15 Torx screwdriver
- Options to be installed such as expansion boards, monitors, uninterruptible power supply (UPS), power supplies, hard drives, hard-drive cages, tape drives, processors and their power modules, or memory
- Application software
- Cage nut fitting tool
- Phillips-head screwdriver
- Flat-head screwdriver
- Pencil

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Removing the Shipping Brackets and Screws

To protect the power supply and I/O Module from any damage during shipment, each is installed with a protective covering bracket. Use the following illustration to loosen the screw and remove the bracket.

IMPORTANT: Save the bracket in a safe location. You will need to replace it if you have to ship the server in the future.

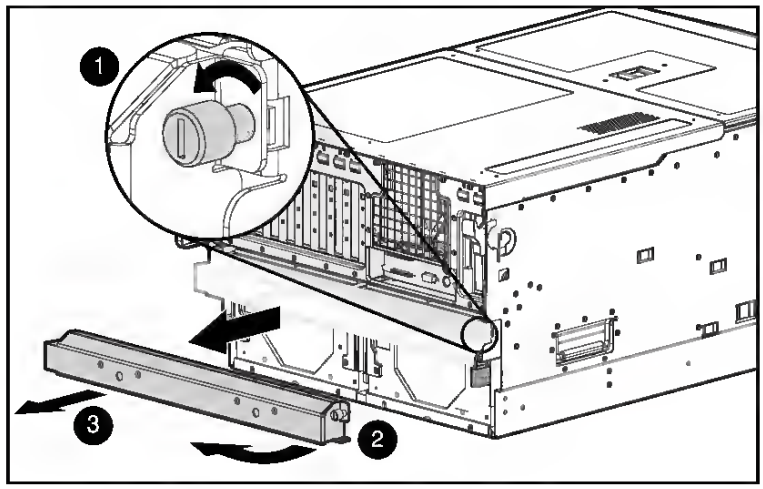

Figure 2-1. Removing the power supply shipping bracket

After loosening the screw, rotate the bracket away from the server by pulling on the right end of the bracket. When the left end disengages, remove the bracket.

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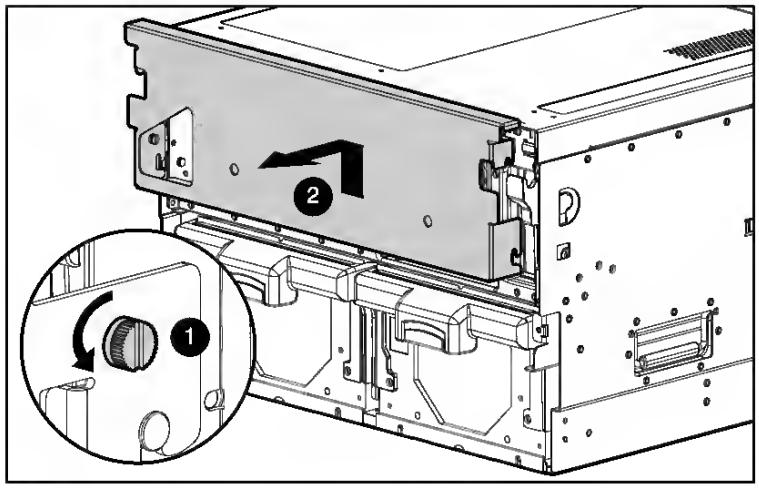

Figure 2-2. Removing the I/O Shipping bracket

The ProLiant 8500 server has a top latch security screw as shown in the following figure. The top latch security screw is provided to prevent access to the Processor and Memory module and the I/O module. If this screw is locked, loosen it as shown in the figure.

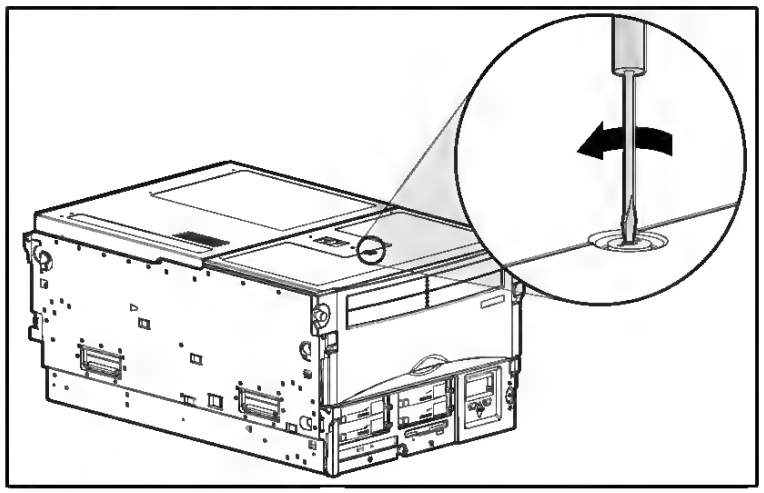

Figure 2-3. Top security screw

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Slide the top access panel open.

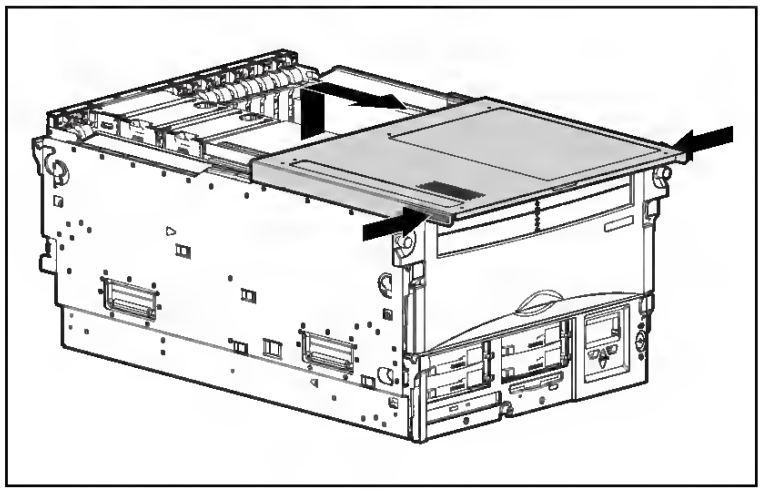

Figure 2-4. Opening the top access panel

Loosen the shipping screw between the Host Module and the I/O Module as shown in the following figure.

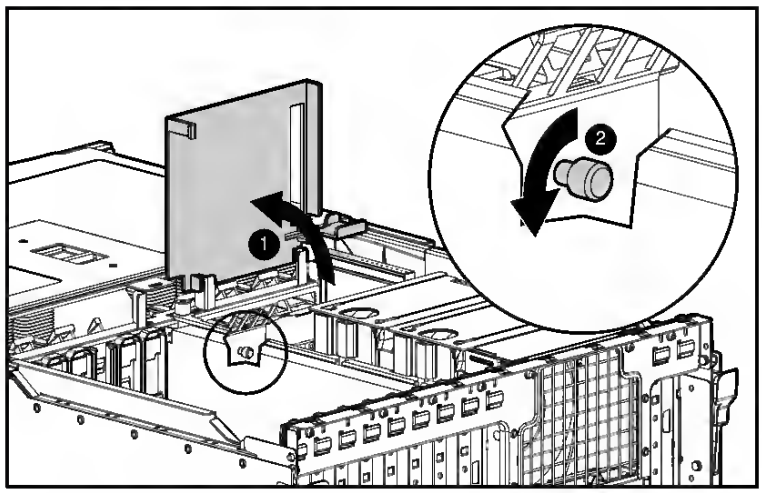

Figure 2-5. Loosening the shipping screw

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Locating the Server Access Panel Labels and System Interlock Status Indicators

A significant amount of server configuration and options installation information is provided on the panel labels. As shown in the following figure, these labels are located on the top of the unit and on the sides of the Processor and Memory module. To access the appropriate label, see Chapter 4, "Installing Hardware Options."

NOTE: These labels do not contain warning and caution information. Refer to this guide or to the option documentation for the applicable warnings and cautions

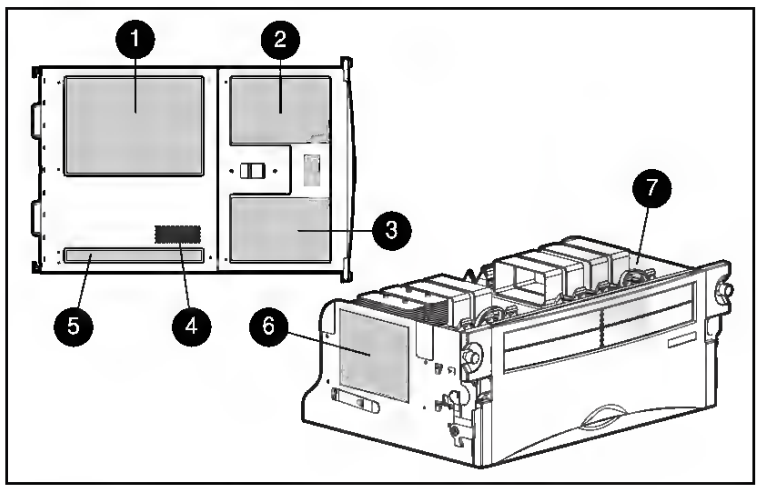

Figure 2-6. Location of labels and indicators

❶ I/O board information
❷ Options installation
❸ Module access
❹ System Interlock Status Indicators
❺ Additional I/O information
❻ Processor board configuration
❼ Memory installation

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Rack Warnings and Precautions

Before beginning these procedures, make sure you understand the following warnings:

WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
- The full weight of the rack rests on the leveling jacks.
- The stabilizing feet are attached to the rack if it is a single rack installation.
- The racks are coupled together in multiple rack installations.
- A rack may become unstable if more than one component is extended for any reason. Extend only one component at a time.

IMPORTANT: The Compaq Installing Rack Products CD is included with the server.

You may also want to refer to the following documentation:

- *Rack Resource CD Kit* (shipped with Compaq racks or available through a Compaq authorized reseller)
- *Rack Builder Configuration Tool CD* (available on the Compaq website or can be ordered with the Rack Resource CD Kit)
- *Rack Information Library CD* (available on the Compaq website or can be ordered with the Rack Resource CD Kit)

Server Warnings and Precautions

WARNING: To reduce the risk of electric shock or damage to the equipment:

- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded electrical outlet that is easily accessible at all times.
- Install the power supply before connecting the power cord to the power supply.
- Unplug the power cord before removing the power supply from the server.
- If the system has multiple power supplies, disconnect power from the system by unplugging all power cords from the power supplies.

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CAUTION: Because the ProLiant 8500 server does not have safety interlocks, it is possible for a unit to be operated without the cover and air baffles properly installed. This could cause thermal damage in the system and may void your warranty. The Rack-Mountable Compaq ProLiant Server should always be operated with the system unit cover on. Proper cooling will not be achieved if the system unit cover is left open for a long period of time.

Attaching the Slide Rails to the Server

1. Carefully align the three screw holes on each side of the server and the slide rail assembly. Attach the server to the inner slide with four 8-32 slotted head screws.

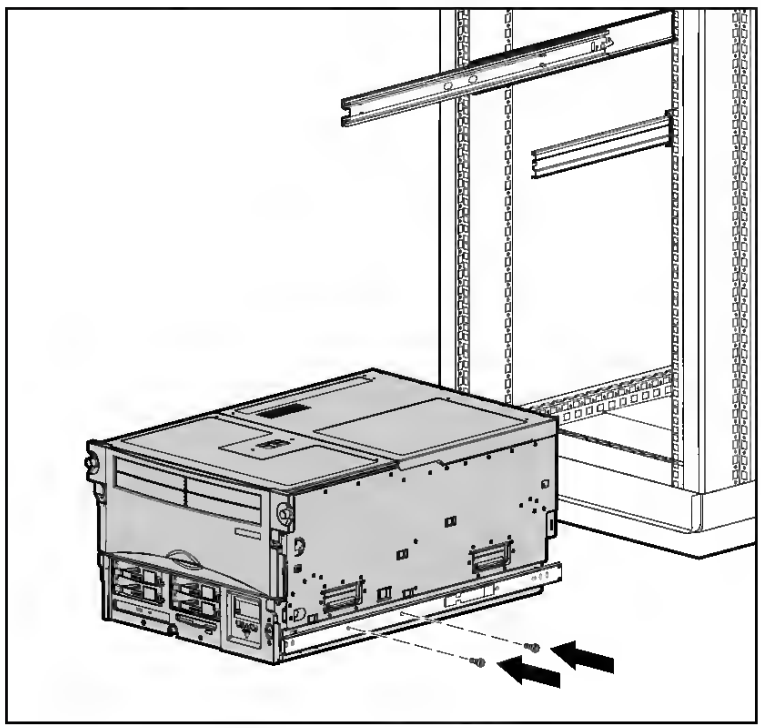

Figure 2-7. Attaching the slide rails to the server

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Attaching the Slide Rails to the Mounting Brackets

The slide rails and mounting brackets form assemblies that attach to the rack. To attach the slide rails to the mounting bracket:

1. Locate the slide rails and the mounting brackets.
2. Position and insert a slide rail inside a mounting bracket, making sure that the front of the slide rail is at the front of the mounting bracket. To identify the front of the slide rail and mounting bracket:
   a. The front of the slide rail allows the inner slide to move forward.
   b. The front of the mounting bracket has screw threads on its flange.

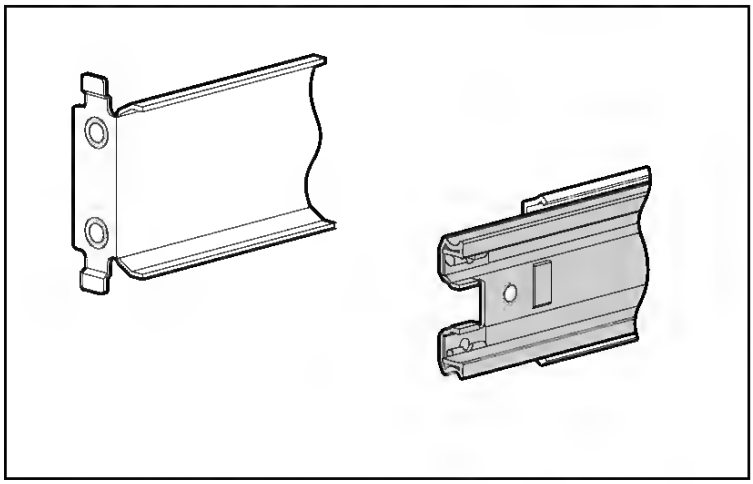

Figure 2-8. Identifying the front of the mounting bracket and the slide rail

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3. Align the front screw holes in the slide rail and the mounting bracket.
4. Fasten the slide rail to the mounting bracket with three 8-32 x 1/4-inch slotted screws (supplied).

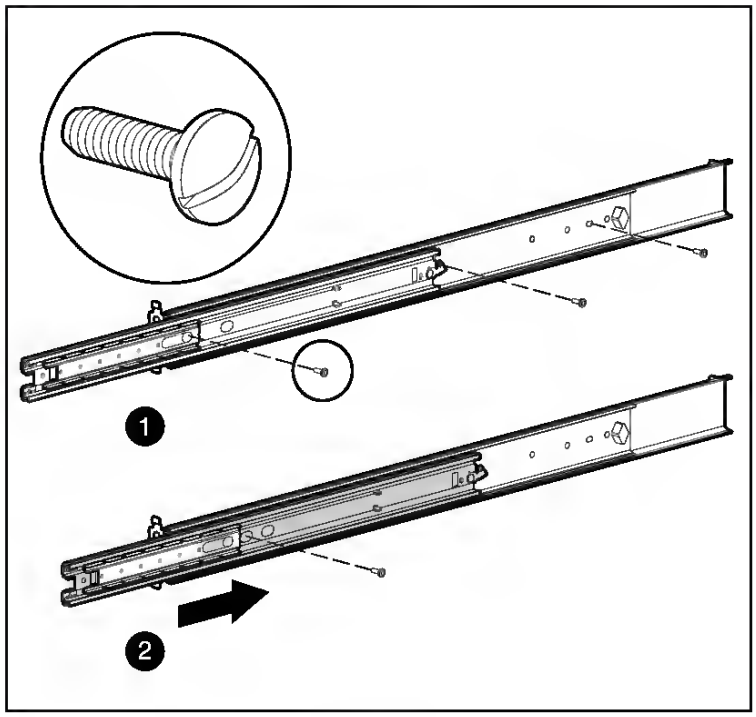

Figure 2-9. Attaching the slide rail to the mounting bracket

5. Repeat steps 1 through 4 for the other slide rail and mounting bracket.

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Attaching the Slide Rail Assembly to the Rack

Attaching the slide rail assembly to the rack consists of the following:

- Marking the server's rack position with the template
- Installing the slide rail assembly on the rack

Marking the Rack with the Template

Use the template provided with the kit to mark the rack for cage nut and mounting bracket positions. Starting at the bottom of the rack or at the top of a previously mounted component:

1. Place the template in the desired location on the front of the rack and press four plastic retainer tabs into the rack holes. Make sure that you match the hole pattern printed on the template with the actual holes on the rack's vertical rails.

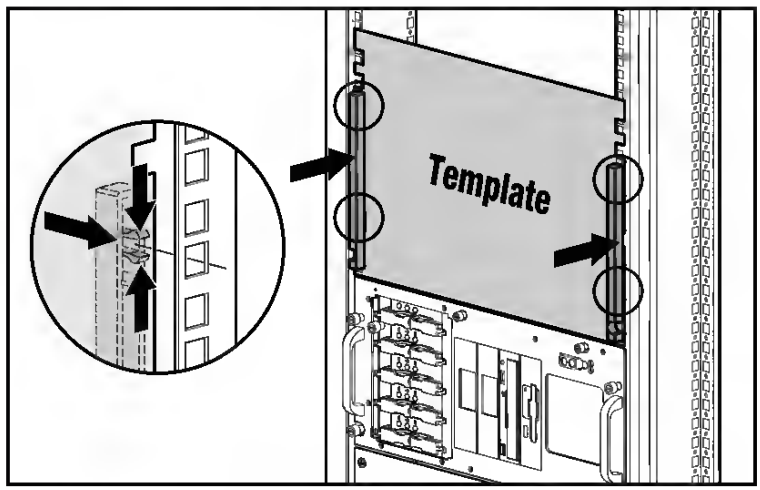

Figure 2-10. Applying the template to the rack

2. Use a pencil to mark the top two locations indicated on the template for the cage nuts that will hold the captive thumbscrews on the rack mount front panel.

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3. Remove the template from the rack by grasping the middle of the top and bottom edges and gently pulling the template as shown in the following figure. This should allow the template to pull away from the plastic rail covers leaving the rail covers in place.

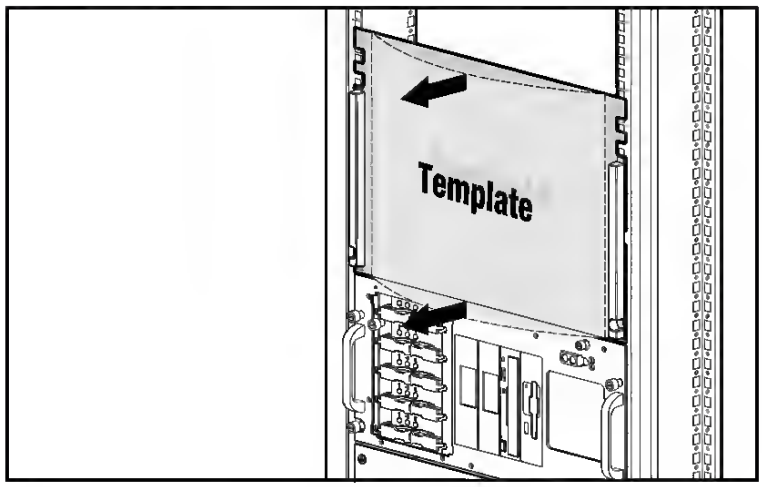

Figure 2-11. Removing the template from the rack

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Inserting Cage Nuts into the Rack Frame

The cage nuts fit **inside** the rails at the marked locations.

1. Use the cage nut fitting tool to insert a cage nut into the rails. Squeeze the prongs together ❶ and insert the cage nut into the appropriate hole in the rack ❷.

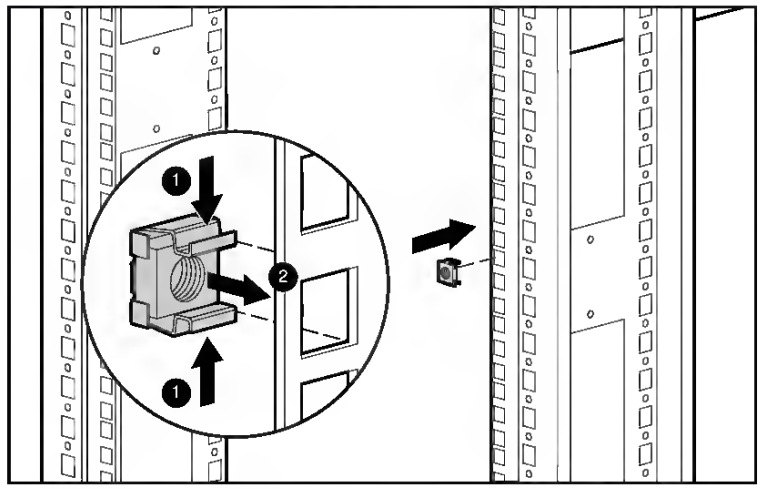

Figure 2-12. Inserting cage nuts

2. Repeat for each cage nut in front and rear of rack.
3. Place the template on the back of the rack to mark the location for the two cage nuts. Also mark where the top of the template is on the rack. This helps align the next components.

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Installing the Slide Rail Assembly to the Rack

To install the slide rail assembly:

1. Place a mounting bracket in position according to the pencil marks made earlier.
2. Attach the front of the bracket on the inside of the front of the rack with one M6 x 1.0-12L Phillips screw in the bottom hole as shown in the following figure. **Do not use washers.**

IMPORTANT: Use one screw only in the bottom hole of the bracket; otherwise, proper alignment is impossible.

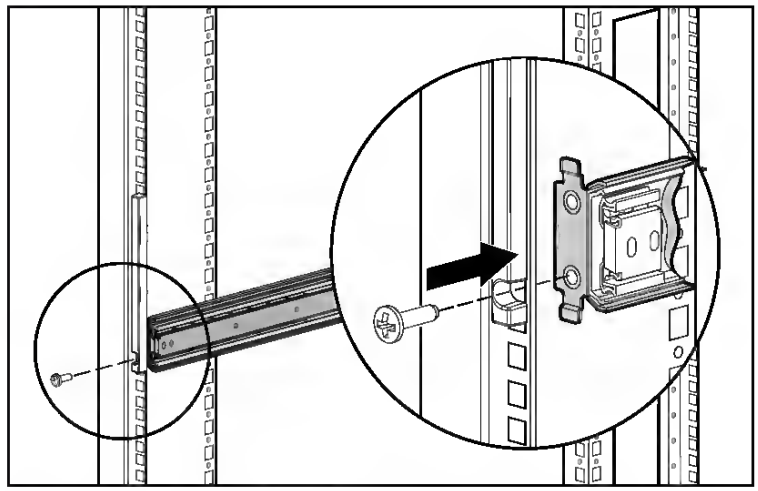

Figure 2-13. Attaching slide rail assembly to the front of the rack

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3. Secure the back of each mounting bracket on the outside of the back of the rack with one cage nut and one M6 x 1.0-12L Phillips screw in the bottom hole of the bracket as shown in the following figure.

IMPORTANT: Make sure that the mounting bracket is level from front to back. Use one screw only in the bottom hole of the bracket; otherwise, proper alignment is impossible.

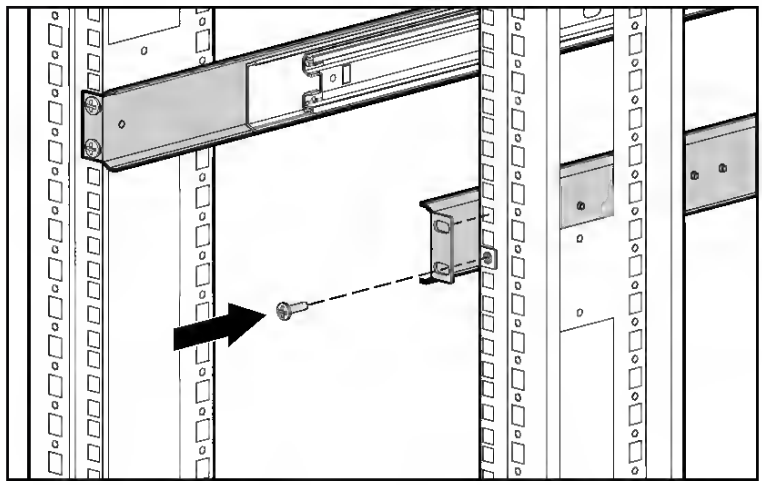

Figure 2-14. Attaching the slide rail assembly to the back of the rack

Installing the Server into the Rack

WARNING: To reduce the risk of personal injury or damage to the equipment:

- Observe local Occupational Safety requirements and guidelines for heavy equipment handling.
- Obtain adequate assistance to lift and stabilize the chassis during installation or removal.
- Remove all pluggable power supplies and modules to reduce the weight of the chassis.
- The unit will be unstable when not mated with the rails.

IMPORTANT: To reduce the weight of the system, Compaq recommends that all power supplies, Processor and Memory Module, and Media Module should be removed from the system before loading in onto the rails

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1. Extend the slides fully.

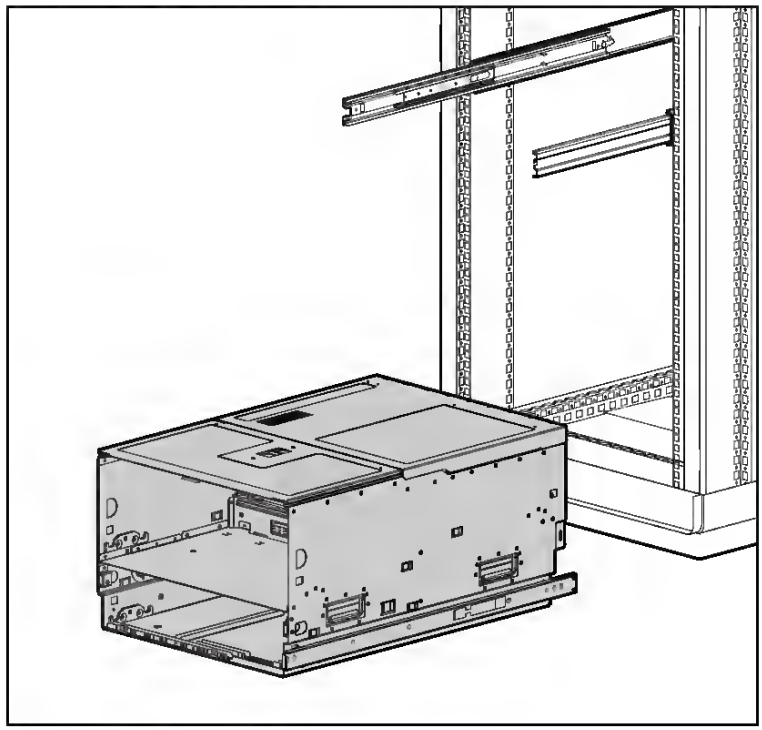

Figure 2-15. Extending the slides

2. Remove the modules to lighten the chassis if desired (See Chapter 3, "Server Operation" for removal instructions.)
3. Lift the server with the recessed Integrated Server Lift Handles.
4. Set the server into the extended slides.

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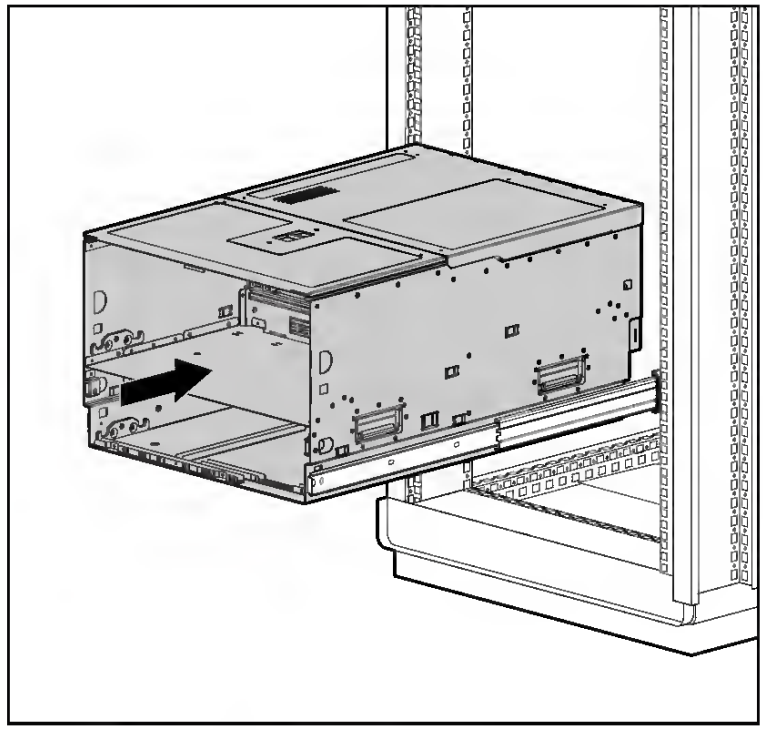

Figure 2-16. Setting the server on the slide rails

5. Slide the server between the extended slides as far as it will go.

WARNING: To reduce the risk of personal injury, be careful when pressing the component rail release latches and sliding the component into the rack. The slide rails could pinch your fingertips.

CAUTION: Be sure to keep the server parallel to the floor when sliding the component rails into the slide rails. Tilting the component up or down could result in damage to the rails.

6. Slide the server in and out of the rack several times to align the slide rail assembly properly.

IMPORTANT: The first time you slide the component into the rack, you may have to apply some pressure. After the first time, the ball bearings in the slide will move easily.

7. Replace any hardware that was removed for installation (power supplies, Processor and Memory Module, or Media Module).

8. Secure server to rack with thumbscrews.

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Attaching the Cable Management Arm Bracket and Cable Management Arm

The cable management bracket and arm assembly lets you organize and secure the cables in the back of the server. The cable management arm attaches to the cable management arm bracket on the server and to the rack. All cables to and from the server are tied to this arm and swing out of the way when you access the server.

Installing the Cable Management Arm Bracket

The cable management arm bracket holds the cable management arm on the server.

To install the cable management arm bracket:

1. Slide the server out or access it from the rear of the rack.
2. Attach the cable management arm bracket to the left side of the back of the server using the integrated thumbscrew.

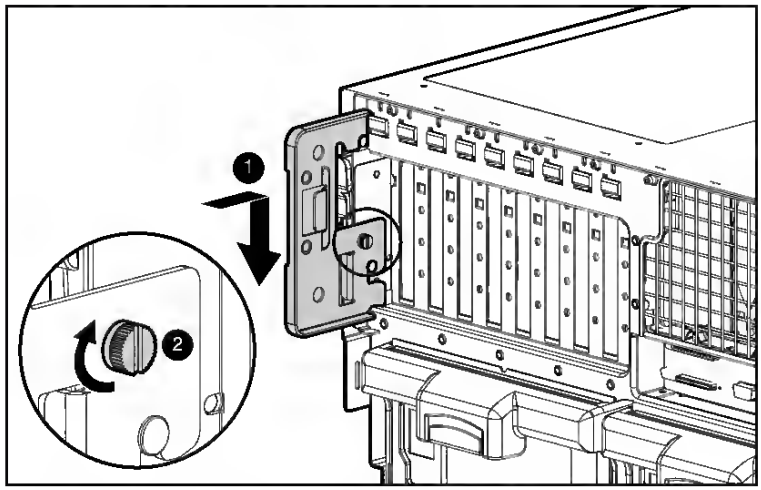

Figure 2-17. Attaching a cable management arm bracket

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Installing the Cable Management Arm

To attach the cable management arm:

NOTE: The following procedure describes installing the Cable Management Arm supplied with the ProLiant 8500 server. For complex rack installations including a large number of cables, you can obtain an optional High Capacity Cable Management Arm available as an option kit, part number 124711-B21.

1. Slide the server into the rack.
2. Attach the cable management arm to the cable management arm bracket using two M6 x 1.0-12L Phillips screws.

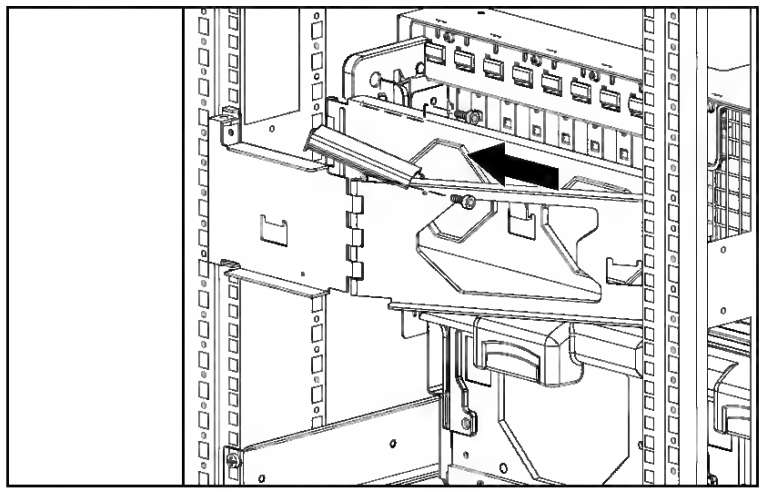

Figure 2-18. Attaching the cable management arm to its bracket

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3. Align the other end of the cable management arm on the **outside** of the rear rack frame. Attach the end with the M6 x 1.0-12L washer face Phillips-head screws.

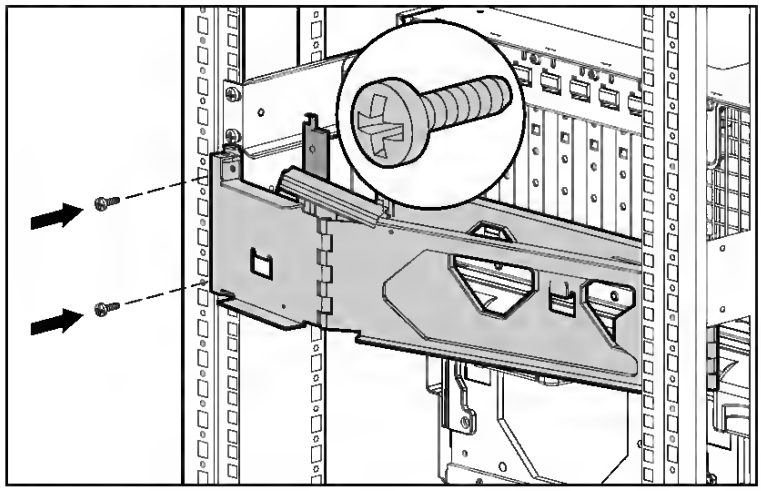

Figure 2-19. Attaching the cable management arm to the rack

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Cabling the Server

1. Connect the power cord(s) and peripheral devices such as the keyboard, mouse, and monitor. The following figure and table identifies the peripheral connectors on the back of the server.

NOTE: When the power cord is connected, the IMD display should light up, if installed, indicating that the server is now in Standby mode.

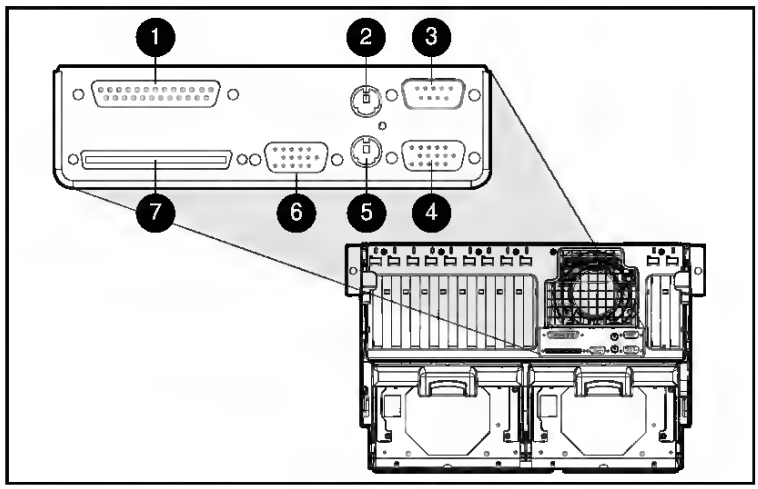

Figure 2-20. Rear panel connectors

❶	Parallel port	❺	Mouse connector
❷	Keyboard connector	❻	Video Port
❸	Serial B connector	❼	External SCSI connector
❹	Serial A connector		

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2. Secure the AC cord with the retention clip provided on the power supply, as shown in the following figure, to prevent the cord from being accidentally disengaged.

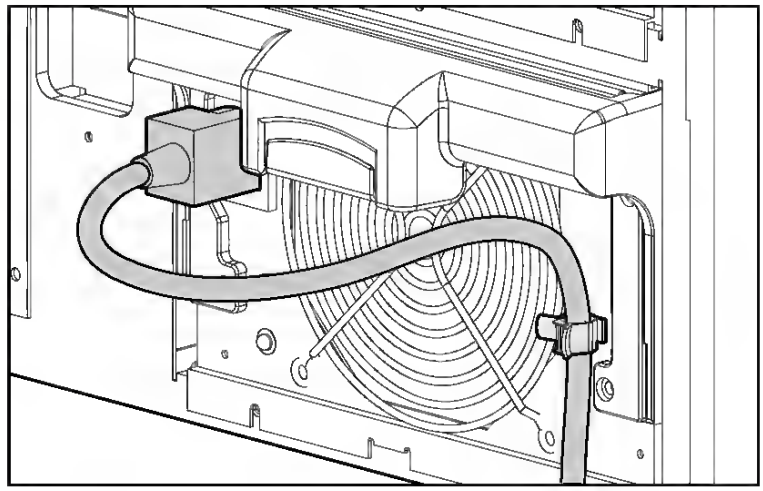

Figure 2-21. Securing the power cord with the loop provided

WARNING: To reduce the risk of electric shock or damage to the equipment:

- Install the power supply before connecting the power cord to the power supply.
- Unplug the power cord before removing the power supply from the server.
- If the system has multiple power supplies, disconnect power from the system by unplugging all power cords from the power supplies.
- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.

WARNING: To reduce the risk of electrical shock or fire, do not plug telecommunications/telephone connectors into the Network Interface Card (NIC) receptacles.

3. If you install a switch box in the rack, route the CPU-to-switch-box cables to the switch box.

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4. Bundle all of the cables, including the power cables, and secure them to the cable management arm using the attached velcro loops.

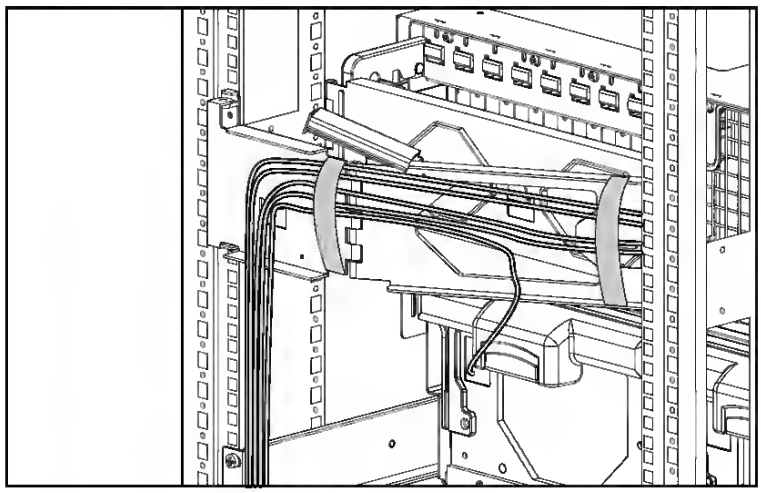

Figure 2-22. Routing and securing the cables

5. If you are going to route cables to the other side of the rack, attach the bundled cables to the cable support and join the other cables in the opposite cable channel.

6. Extend the bundled cables down the rack's cable channel.

Powering Up the Server

You can now bring your ProLiant 8500 server online in accordance with your network and operating system procedures.

Press the momentary Power On/Standby switch to turn the system on. The power LED may blink for a few seconds until full power is on. If this LED turns amber, extend the server on its rails and check the System Interconnect Status Indicators. Refer to Table 3-2 to identify the source of the problem.

When the system is first powered on, the system ROM detects the unconfigured state of the hardware and provides default configuration settings for most devices. By providing this initialization, the system can run Diagnostics and other software applications before running the normal SmartStart and System Configuration programs.

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If you insert a SmartStart and Support Software CD in the CD-ROM drive prior to powering on the server, the system ROM will boot to that utility. If the system ROM does not detect one of those CDs, you will be prompted for your intended operating system. The system will reboot if any operating system-dependent configurations have changed with the new operating system selection. If the selected operating system-dependent configurations are the same as the current configurations, the system will boot normally. If you enter a wrong choice, on subsequent re-boots you may change your operating system selection.

Powering Down the Server

The system power in the ProLiant 8500 does not shut off completely with the front panel Power On/Standby switch. The two modes of the switch are ON and STANDBY, rather than ON and OFF. The STANDBY position removes power from most of the electronics and the drives, but portions of the power supply, the Integrated Management Display (IMD), the system interlock circuitry, and some internal circuitry remain active. To completely remove all power from the system, you must disconnect all power cords from the server.

WARNING: To reduce the risk of electric shock or damage to the equipment, disconnect power from the server by unplugging all power cords from either the electrical outlet or the server.

NOTE: Windows NT users may use the Compaq Power Down Manager to power down their server. For information refer to the NTREADME.HLP file on diskette 1 of the NTSSD.

1. Press the Power On/Standby switch to STANDBY. This places the server in standby, thereby disabling the main power supply output and providing auxiliary power (+ 5V) to the server. Standby does not disable main output power.
2. Verify that the system LED on the front panel, near the power on/standby switch, goes dark and fan noise abates.
3. Disconnect all power cords from the server to disable power to the server.

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Chapter 3

Server Operation

The ProLiant 8500 Server provides easy access to all internal components for installation and maintenance. The information below provides details concerning system power and power supply indicators and removal of the server modules.

WARNING: The power supplies in the ProLiant 8500 server produce hazardous energy levels. The installation of options and the routine maintenance and service of this product should be performed by individuals who are knowledgeable of the procedures, precautions, and hazards associated with equipment containing hazardous energy circuits.

NOTE: All ProLiant servers support server management features that provide in-depth monitoring, analysis, and control of the fault performance and configuration aspects of Compaq servers. Refer to the Compaq Server Reference Library CD for information about server management features, flash ROM, and the Compaq Insight Manager.

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System Power

The system power in the ProLiant 8500 Server does not shut off completely with the front panel Power On/Standby switch. The two modes of the power switch are ON and STANDBY, rather than ON and OFF. The STANDBY position removes power from most of the electronics and the drives, but portions of the power supply, the Integrated Management Display (IMD), the system interlock circuitry and some internal circuitry remain active.

To remove all power from the system completely, you must disconnect all power cords from the server.

WARNING: To reduce the risk of electric shock or damage to the equipment:

- Disconnect power from the system by unplugging all power cords from the power supplies.
- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.

CAUTION: Electrostatic discharge can damage electronic components. Be sure you are properly grounded before beginning any installation procedure. See Appendix B, "Electrostatic Discharge," for more information.

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Power Supply Indicators

Each power supply has status and AC power indicators. See Figure 3-1 and Table 3-1 for a detailed description of both indicators.

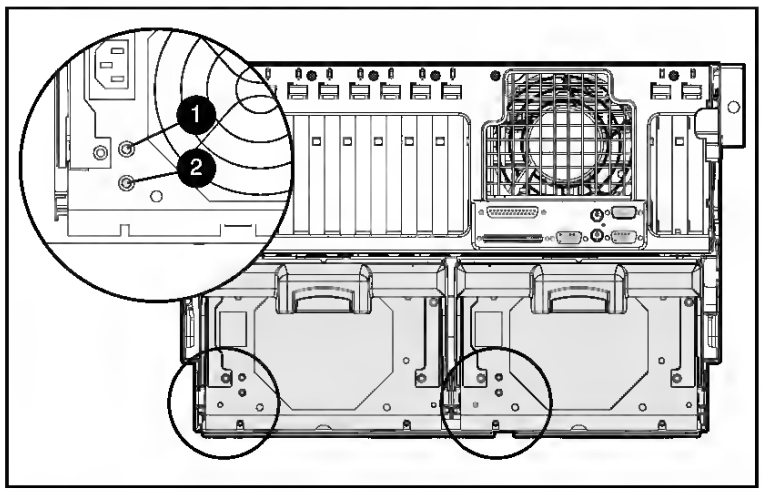

Figure 3-1. Power supply indicators

Table 3-1
Power Supply Indicators

Indicator	Condition	Meaning
❶ Status	Green	Normal operation
⚠	Green/Amber alternating	Power supply failed to restart after a prolonged fault
	Green flashing	Power supply will restart within 20 seconds
	Amber	Fault detected in this power supply
	Amber flashing	Failed self-test
	Off	System in standby mode or interlock(s) disabled
❷ AC Power	Green	AC power is connected to this power supply
☼	Off	No AC power connected to this supply

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Numbering of Power Supplies

The ProLiant 8500 server is provided with the capability for two hot-plug, redundant power supplies. See Chapter 4, "Installing Hardware Options," or the option documentation to replace a power supply.

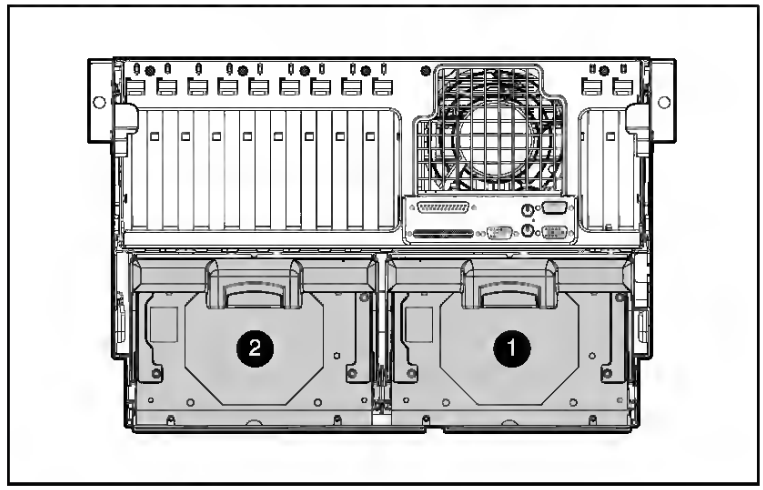

Figure 3-2. Numbering of power supplies

System Interconnect Status Indicators

The system interconnect indicators provided with ProLiant 8500 Server provide a closed-loop checking mechanism for verifying proper component mating and interconnections between critical server components. LEDs inside the sliding top cover provide visual assistance in isolating components to check if the server will not power up due to a component or module that is not fully installed. If a light is on, reseat the component represented by the indicator. Labels next to the LEDs identify the component causing the problem. Refer to the hood labels for component location.

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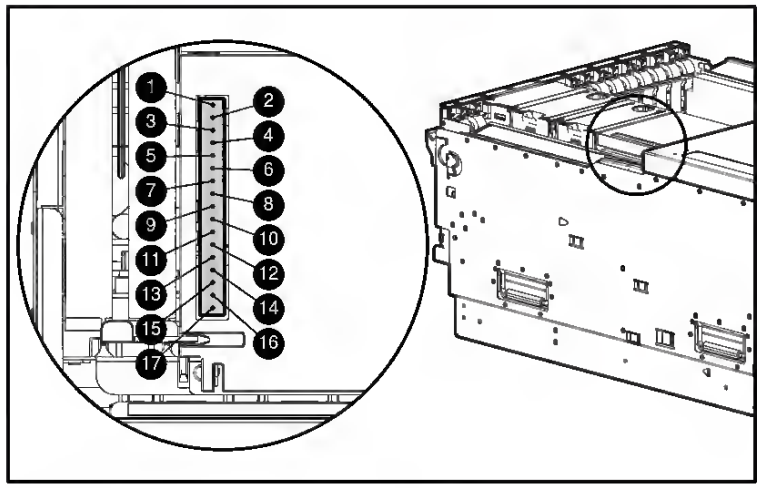

Figure 3-3. Accessing system interconnect status LEDs

Table 3-2
System Interconnect Status Indicators

Indicator	Component	Indicator	Component
❶	Emergency Shutdown[1]	❿	Termination PPM
❷	Processor 8	⓫	Memory Board
❸	Processor 7	⓬	Processor/Memory Module
❹	Processor 6	⓭	I/O Module
❺	Processor 5	⓮	Media Module
❻	Processor 4	⓯	SCSI backplane 1
❼	Processor 3	⓰	SCSI backplane 2
❽	Processor 2	⓱	System Reset[2]
❾	Processor 1		

Note 1: AC power to the system has been cut to avert imminent component damage and data loss. Reasons for this could include: the failure of the terminator PPM, the fan controller has stopped responding, or the system has recorded a temperature violation.
Note 2: A power supply has stopped providing adequate power as per system specifications, the system has experienced a short, a PPM has failed, or a reboot has been initiated via Automatic Server Recovery (ASR-2).

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Server Access Panel and Modules

The Compaq ProLiant 8500 server chassis facilitates the installation of hardware upgrades through the use of three removable modules and a sliding top access panel. The following table describes the contents of the modules and how to how to access the components.

Table 3-3
Module and Bay Components and Access

Module	Contents	To Access
I/O Module with system fans	PCI Hot Plug expansion slots	Slide top access panel toward the front of the server, rotate air baffle
	Configuration switches	Slide top access panel toward the front of the server
	Fans 1 and 2	Slide top access panel toward the front of the server
Processor and Memory Module	Processor (CPU) sockets	Remove Processor and Memory Module
	Processor bus/core ratio switches	Remove Processor and Memory Module
	Cache Accelerator	Remove Processor and Memory Module
	Memory (DIMMs)	Open Processor and Memory Module to first stop. Remove memory board.
Media Module	CD-ROM/ Diskette/IMD	Remove Media module
Hard drive bays	Hot-plug hard drives	Access directly at front of server

The following sections provide instructions for removing the Processor and Memory Module, Media module, and I/O Module. For information pertaining to PCI Hot Plug and Hot Plug I/O Fan access, see Chapter 4, "Installing Hardware Options."

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Accessing the I/O Module

To open the I/O Module to install or replace hot-plug fans or hot-plug PCI boards:

1. Slide the chassis out of the rack.
2. Lift the forward most edges of the top access panel, as indicated by the arrows in the following figure, and slide it toward the front of the server.

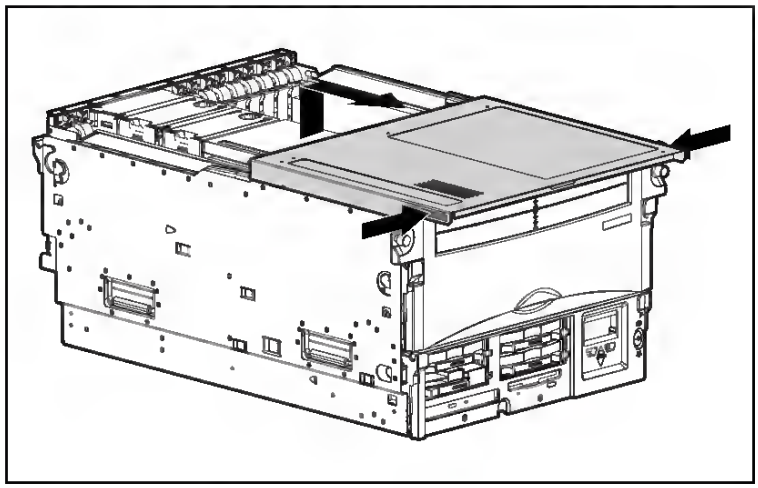

Figure 3-4. Opening the top access panel

3. At this point, you can remove and replace the hot-plug fans and hot-plug PCI boards as described in Chapter 4, "Installing Hardware Options."

Removing the I/O Module

Use the procedure in the preceding section, "Accessing the I/O Module" to install or replace hot-plug fans or hot-plug PCI boards.

CAUTION: Do not attempt to open any of the three modules while power is applied to the system. They are not hot pluggable. Immediate system shutdown and loss of data will occur.

To replace or service non hot-plug components or problems in the I/O Module.

1. If the computer is on, place the computer in Standby mode. See Chapter 2, "Server Installation."

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2. Push in on the sides of the cam levers ❶ on the I/O Module and rotate the top of the levers downward ❷ as shown in the following figure.

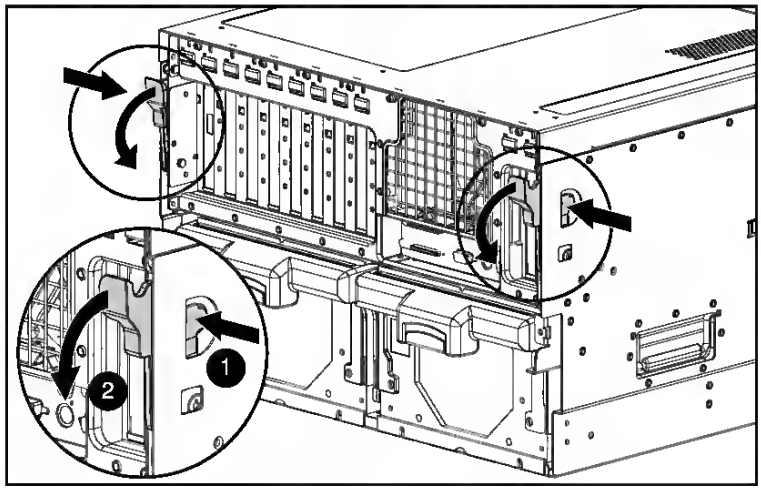

Figure 3-5. Removing the I/O Module

3. Pull the I/O Module out of the chassis until it reaches the module stop latch.

4. Press the module stop latches in and pull the module out of the chassis as shown in the following figure.

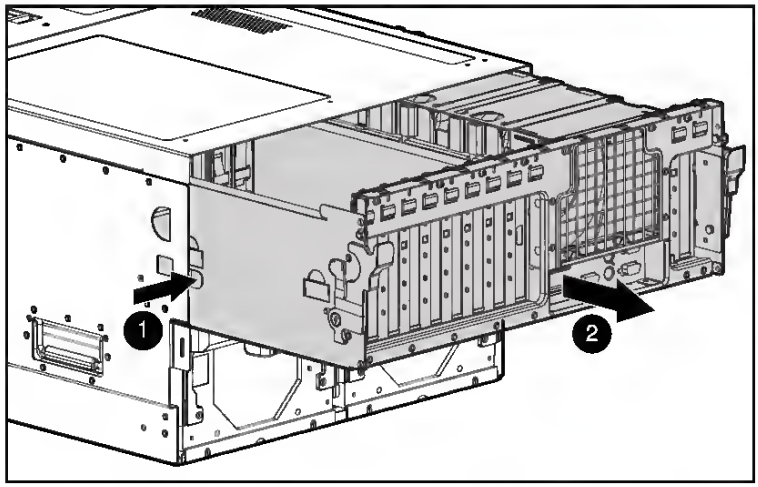

Figure 3-6. Removing the I/O Module from the chassis

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5. Set the module aside for servicing non hot-plug components.

WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

CAUTION: Never operate the server for extended periods of time, with an access panel or module removed or partially installed. Doing so will cause thermal damage to the system and could void your warranty.

6. To view the top panel labels, pull the chassis out of the rack until it makes contact with the rail stop.

NOTE: These top panel labels provide instructions on installing expansion boards, setting switches, and installing Hot Plug fans, as well as information on PCI Hot Plug. See Chapter 4 "Installing Hardware Options" for Hot Plug procedures.

7. To reassemble the server, slide the module in until the ejectors begin to rotate. Then push ejectors shut until they snap into place.

Opening the Processor and Memory Module

CAUTION: Do not attempt to open any of the three modules while power is applied to the system. They are not hot pluggable. Immediate system shutdown and loss of data will occur.

To open the Processor and Memory Module:

1. If the computer is on, place the computer in Standby mode. See Chapter 2, "Server Installation."
2. Push the sides of the latches ❶ on the Processor and Memory Module in and rotate the top of the levers downward ❷ as shown in the following figure.
3. Pull the Processor and Memory Module out of the chassis until it encounters the module stop latch.
4. At this point you can remove the memory board to add or replace memory modules as described in Chapter 4, "Installing Hardware Options."

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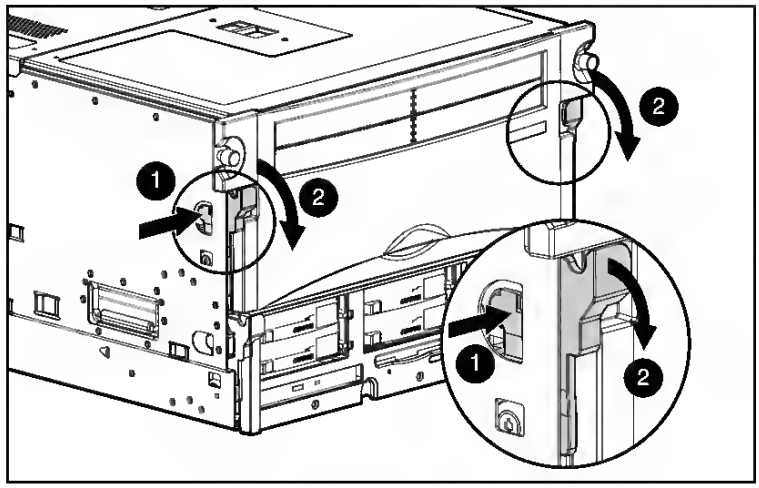

Figure 3-7. Opening the Processor and Memory Module

Removing the Processor and Memory Module

1. Follow steps 1 through 3 of the preceding section, "Opening the Processor and Memory Module."
2. Press the module stop latches ❷ in and pull the module out of the chassis ❶ as shown in the following figure.
3. Set the module aside for adding or replacing processors, processor power modules, and cache accelerators.

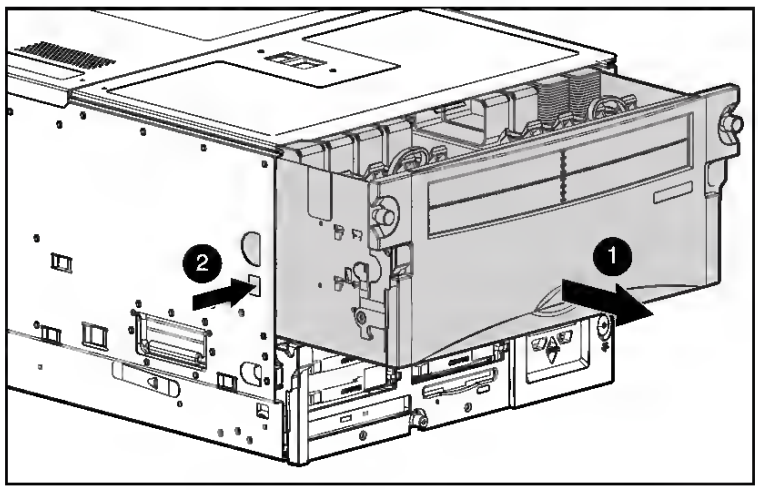

Figure 3-8. Removing the Processor and Memory Module

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WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

NOTE: The top panel labels and module side labels provide instructions on installing processors, DIMMs, and processor power modules.

4. To reassemble the server, slide the module in until the ejectors begin to rotate. Then push ejectors shut until they snap into place.

Processor Serial Number

The Processor Serial Number is a Pentium III Xeon processor manageability feature. It can be used for network inventory and tracking purposes. Compaq ProLiant 8500 servers are shipped with this feature disabled. You can enable the feature using the System Configuration utility.

Removing the Media Module

CAUTION: Do not attempt to open any of the three modules while power is applied to the system. They are not hot pluggable. Immediate system shutdown and loss of data will occur.

To remove media module:

1. If the server is on, place it in Standby mode and disconnect the power cord(s). See Chapter 2, "Server Installation."
2. Push the sides of the cam levers ❶ on the media module in and rotate the top of the levers downward ❷ as shown in the following figure.
3. Pull the media module out of the chassis until it makes contact with the module stop latch.

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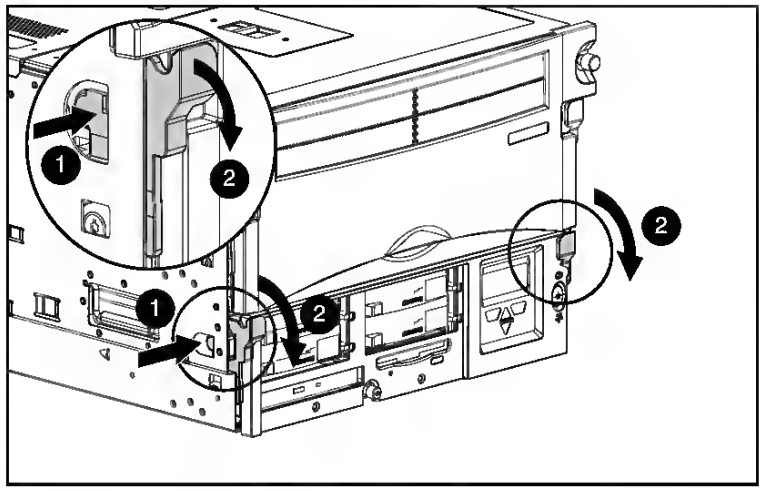

Figure 3-9. Opening the media module

4. Press the module stop latches in and pull the module out of the chassis.
5. Set the module aside for adding or replacing the diskette drive or CD-ROM drive as described in Chapter 4, "Installing Hardware Options".

WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

NOTE: The top panel labels provide instructions on installing processors, DIMMs, processor power modules, and hard drives.

6. To reassemble the server, slide the module in until the ejectors begin to rotate. Then push ejectors shut until they snap into place.

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Refer to the following figure to identify components in the Media Module.

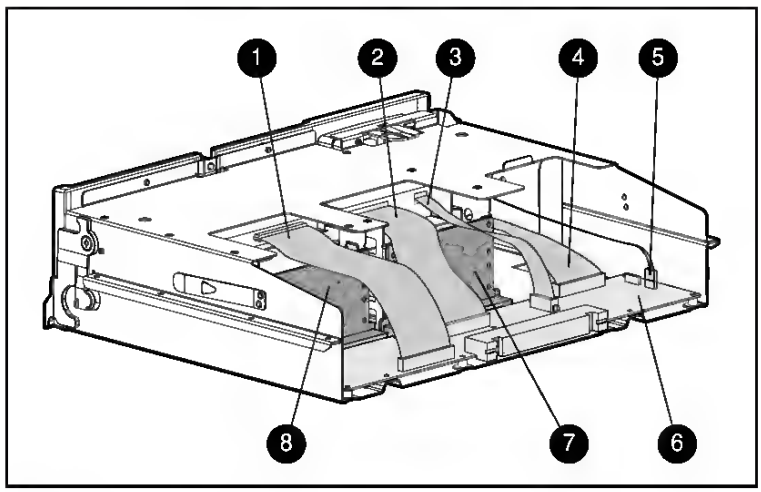

Figure 3-10. Media Module components

❶ CD-ROM drive signal/power cable

❷ Diskette drive signal cable

❸ Diskette drive power cable

❹ IMD signal/power cable

❺ Power switch/LED and thermistor cable

❻ Media backplane assembly

❼ SCSI backplane assembly 1

❽ SCSI backplane assembly 2

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Chapter 4

Installing Hardware Options

The following instructions are provided as an overview for installing hardware option upgrades. Compaq recommends that you use the documentation provided with the hardware option for complete installation instructions. You can also refer to the *Compaq ProLiant 8500 Hardware Installation and Configuration* poster included in the shipping box or the labels attached to the top panel of the server.

WARNING: To reduce the risk of personal injury or damage to the equipment, heed all warnings and cautions throughout the installation instructions.

WARNING: To reduce the risk of personal injury or damage to the equipment, the installation of options other than hot-plug power supplies and hot-plug hard drives should be performed only by individuals who are qualified in servicing computer equipment and trained to deal with products capable of producing hazardous energy levels.

CAUTION: Electrostatic discharge can damage electronic components. Be sure you are properly grounded before beginning any installation procedure. See Appendix B, "Electrostatic Discharge," for more information.

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Installing a Hot-Plug Power Supply

The ProLiant 8500 ships with either one or two hot-plug power supplies depending on the model. The system power in the ProLiant 8500 Server does not have to be shut off to replace one of the power supplies.

WARNING: To reduce the risk of electric shock or damage to the equipment:

- Install the power supply before connecting the power cord to the power supply.
- Unplug the power cord before removing the power supply from the server.
- Disconnect power from the server by unplugging all power cords from either the electrical outlet or the server.

To replace a hot-plug power supply with the system power ON:

1. Remove the power cord from the power supply to be replaced and release the power cord clamp.

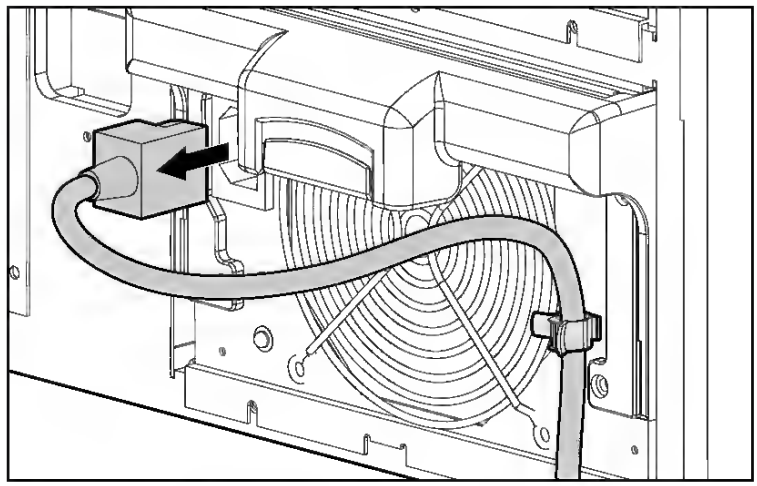

Figure 4-1. Removing power cord

2. Squeeze upward on the release in the middle of the power supply handle ❶.

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3. Rotate the power supply handle down ❷ and slide the supply out of the chassis ❸ as shown in the following figure.

NOTE: When you remove the power supply, a spring-loaded trap door will close to block the opening. This door preserves the air path required to cool the internal components of the server.

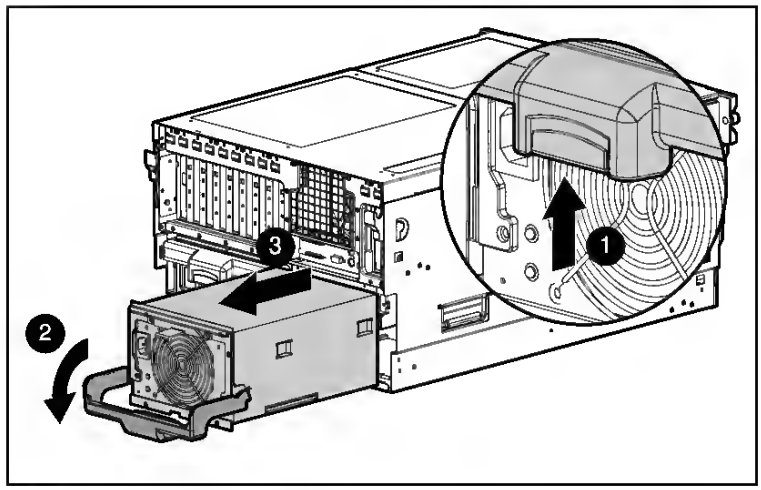

Figure 4-2. Removing a power supply

4. Remove the protective covers from the connector on the new power supply. See the installation documentation that came with the power supply for more information. Keep the protective covers for future handling.
5. Lower the handle on the new hot-plug power supply.
6. Slide the hot-plug power supply into the power supply cage, pushing the spring-loaded trap door open, until the supply is seated securely ❶.
7. Raise the handle to lock the power supply into place ❷. The power supply fan will start immediately if the system is running.

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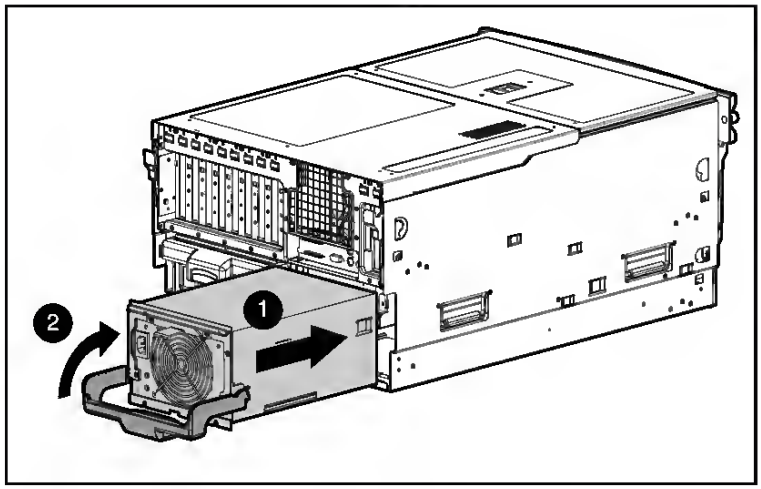

Figure 4-3. Securing the hot-plug power supply

8. Plug in the power cord. If desired, use the plastic retainer to secure the AC cord to the plastic loop provided on the power supply. Leave an 8-inch service loop for the plug. This will prevent the plug from becoming disengaged accidentally.

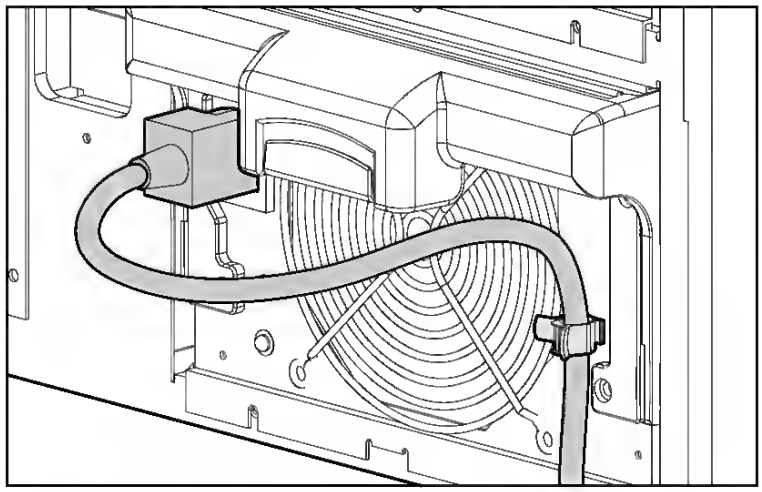

Figure 4-4. Securing the AC cord to the power supply

9. Verify the AC status LED is green. If installation is performed with the system power on, the power supply indicators should activate immediately.

10. For a detailed description of the power supply indicators; see Table 3-1, "Power Supply Indicators" in Chapter 3, "Server Operation."

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Installing a Pentium III Xeon Processor and Processor Power Module

The ProLiant 8500 ships with one to eight Pentium III Xeon processors installed, and it is capable of supporting up to eight processors and eight processor power modules. Each processor requires an associated processor power module. A ninth processor power module is always present to provide processor bus termination power.

Processors with different speeds may be mixed in the ProLiant 8500 server, but all processors must run at speed of the slowest processor.

Processors with different cache sizes may be mixed in groups of two. For information on mixing cache sizes refer to the Compaq website, www.compaq.com.

NOTE: Be sure to keep processor terminator cards as processors are added. The processor terminator cards can be used in the event a processor fails so that the server will run with the remaining processors. Processor terminator cards must be installed in all processor sockets not occupied by processors.

CAUTION: Handle the Pentium III Xeon processor only by the ejectors and, only if necessary, lay the processor on its back (the plastic side with the hologram) to prevent damage to the heat pipes and fins.

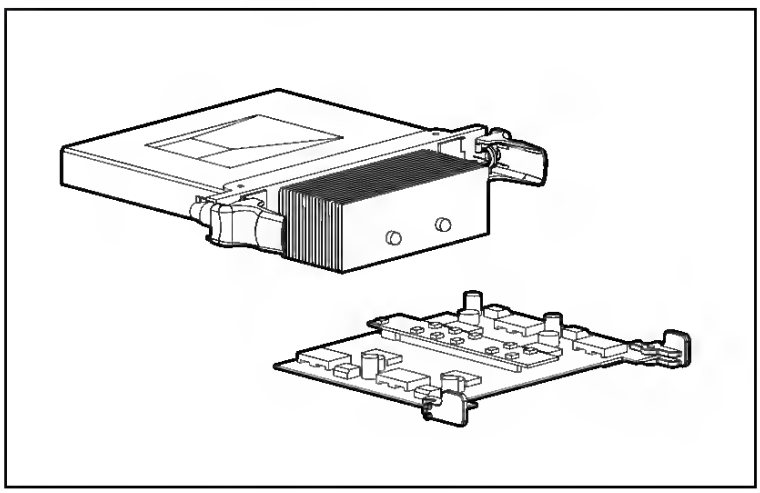

Figure 4-5. Pentium III Xeon processor and processor power module

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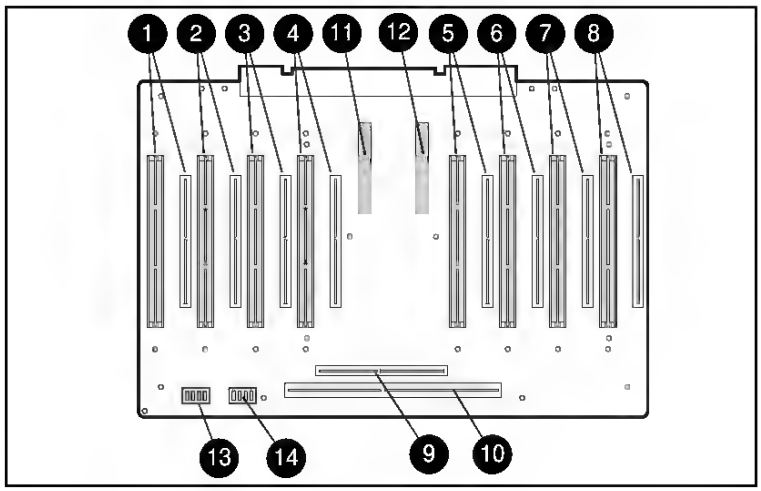

Figure 4-6. Processor board layout

Table 4-1
Processor/Processor Power Module Socket and Associated Bus/Core Ratio Switch Locations

Item	Component	Item	Component
❶	Processor Socket 1 and associated Power Module Socket	❽	Processor Socket 8 and associated Power Module Socket
❷	Processor Socket 2 and associated Power Module Socket	❾	Processor Bus Termination Power Module Socket
❸	Processor Socket 3 and associated Power Module Socket	❿	Memory Board Socket
❹	Processor Socket 4 and associated Power Module Socket	⓫	Bus 1 Cache Accelerator Socket
❺	Processor Socket 5 and associated Power Module Socket	⓬	Bus 2 Cache Accelerator Socket
❻	Processor Socket 6 and associated Power Module Socket	⓭	Bus 1 Processor/Core Ratio Switch
❼	Processor Socket 7 and associated Power Module Socket	⓮	Bus 2 Processor/Core Ratio Switch

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To install a processor power module and a Pentium III Xeon processor in the Processor and Memory Module, refer to one of the following installation sources:

- For a text and illustrated procedure, refer to the documentation provided with the option kit.
- For an illustrated overview of the procedure, refer to the *Hardware Installation and Configuration* poster included in the shipping box or to the Processor board configuration label located on the left side of the Processor and Memory Module.
- For an overview of processor installation, see the procedure below.

1. If the server is on, place it in Standby. See Chapter 2, "Server Installation."
2. Remove the Processor and Memory module. See Chapter 3, "Server Operation."

WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

3. Locate the first available processor socket adjacent to an installed processor. Available sockets will have a processor terminator board installed.

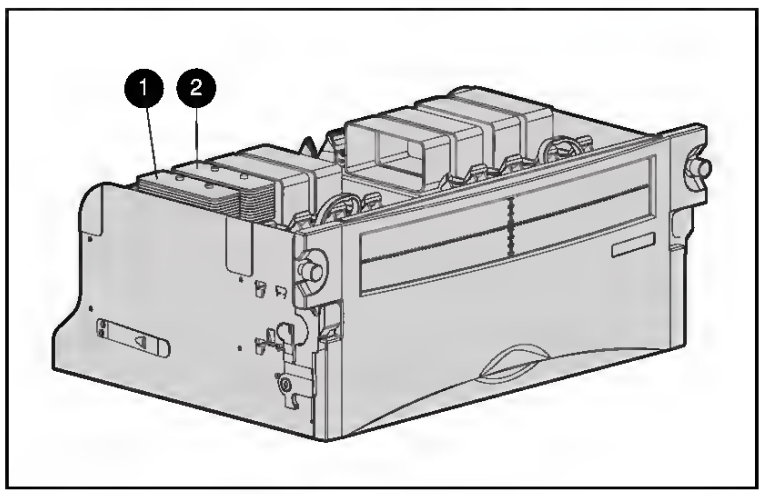

Figure 4-7. Two processors installed in Sockets 1 and 2 (Sockets 3 through 8 shown available)

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4. Rotate the ejector levers ❶ fully to unseat the processor terminator board from the socket. Remove the processor terminator board by pulling it out by the handle ❷. Retain for future use.

NOTE: If you remove a Pentium III Xeon processor, the processor terminator board must be re-installed before powering up the server.

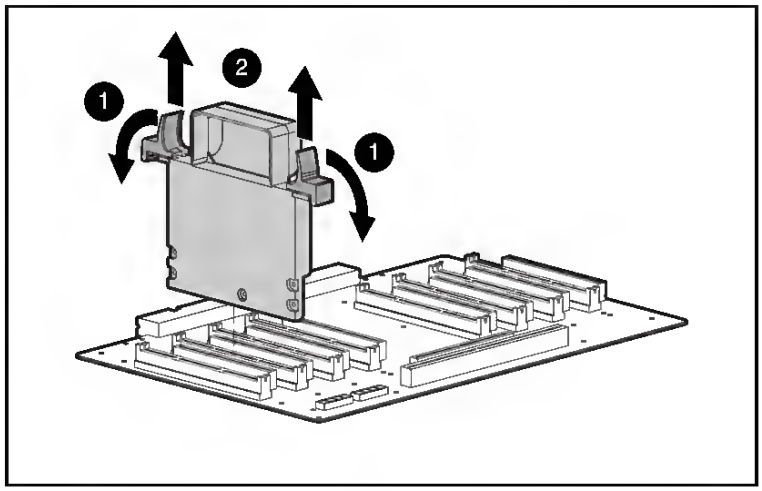

Figure 4-8. Removing the processor terminator board

5. Remove the memory board for easier access to the processor bus/core ratio switch.
6. Locate the processor bus/core ratio switch for the processor bus that will receive the new processor. See Table 4-2 or the panel label.
7. Set the processor bus/core ratio switch to the appropriate setting.

Table 4-2
Processor Bus/Core Ratio Switch Settings

Processor Frequency	Bus/Core Ratio	1	2	3	4
450-MHz models	4 1/2	OFF	ON	OFF	ON
500-MHz models	5	ON	OFF	OFF	ON
550-MHz models	5 1/2	OFF	OFF	OFF	ON
Auto Configuration (Default)	2	OFF	OFF	OFF	OFF

Note: This table indicates the capabilities of the server hardware. It does not mean to imply that processors are available to match each of the settings.

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NOTE: The Pentium III Xeon processor and processor power modules are keyed to ensure correct alignment. Refer to the option documentation for the latest bus/core ratio switch settings.

8. Align the new processor power module with the processor power module socket. Install ❶ and secure the processor power module by rotating the ejector levers inward ❷. You should hear the ejectors click into a locked position.

CAUTION: The processor power module must be installed before the accompanying Pentium III Xeon processor. Attempting to install the processor power module after the Pentium III Xeon processor has been installed could damage the electronic components on the processor power module.

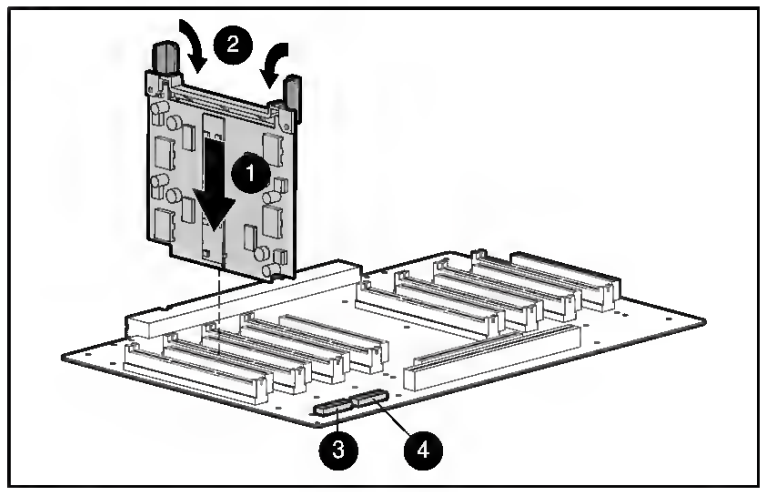

Figure 4-9. Installing the processor power module

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9. Align the new Pentium III Xeon processor with the processor socket. Install the processor ❶, and rotate the ejector levers inward ❷ to fully seat and lock the processor.

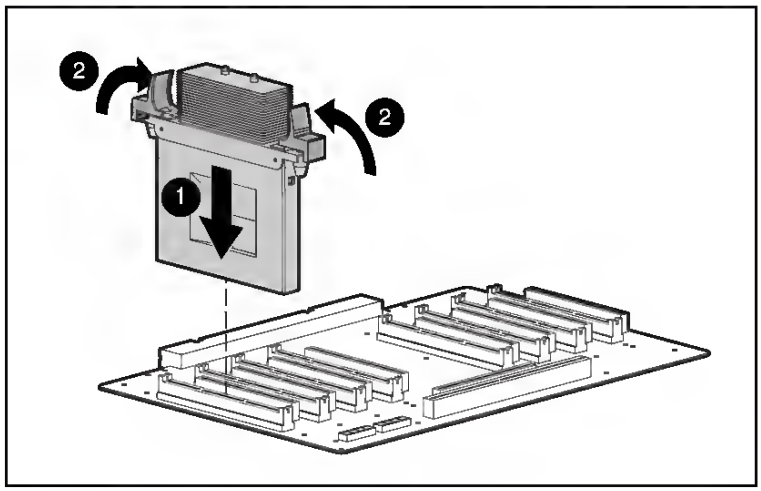

Figure 4-10. Installing the Pentium III Xeon processor

NOTE: If you have installed processors to a total of five or more, you must install Cache Accelerator modules. See the next section, "Installing the Cache Accelerator."

10. Replace the Processor and Memory module into the chassis.
11. Turn on the server. See Chapter 2, "Server Installation." If the system does not power up, open the top access, and verify that the system interlock LEDs are normal. See Table 3-2, "System Interlock Status Indicators" in Chapter 3, "Server Operation."
12. Verify that the processor was installed correctly. Check the processor frequency, cache size, and socket location by reviewing the POST messages on the system console or processor information under the System Information Menu of the IMD. See Chapter 7, "Integrated Management Log."

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Installing the Cache Accelerator

The cache accelerator is an option is *required* for five or more processors. The cache accelerator option should not be used for less than five processors. The following paragraphs provide guidelines on determining which configuration is best for your system.

ProLiant 8500 servers have two processor buses. In the following figure, processor sockets ❶ through ❹ are on processor bus 1. Socket ⓫ is for Cache Accelerator 1. Processor sockets ❺ through ❽ are on processor bus 2 with socket ⓬ for Cache Accelerator 2.

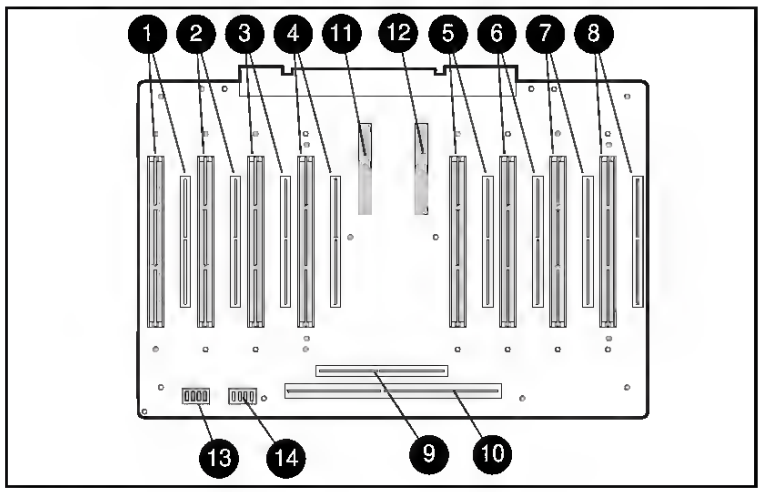

Figure 4-11. Processor board layout

Processors should be added to fill bus 1 before adding processors to bus 2. If processors occupy slots of both processor buses, then the Cache Accelerators for both buses must be installed for proper operation.

To install the cache accelerator in the Processor and Memory module, refer to one of the following installation sources:

- For a text and illustrated procedure, refer to the documentation provided with the option kit.
- For an overview of the installation, see the procedure below.

1. If the server is on, place it in Standby and disconnect the power cord(s). See Chapter 2, "Server Installation."
2. Remove the Processor and Memory module. See Chapter 3, "Server Operation."

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WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

3. Loosen the thumbscrew of the middle air baffle and lift the baffle upward to allow access to the Cache Accelerator slots.

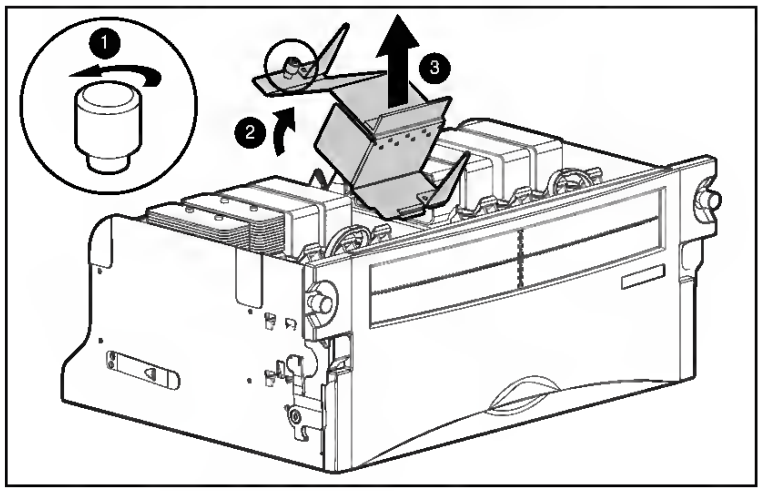

Figure 4-12. Removing middle air baffle

4. Locate the Cache Accelerator slot is shown in the following figure.

NOTE: The Cache Accelerator modules are keyed to ensure correct alignment.

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5. Align the Cache Accelerator module with the socket closest to installed processors. Install and secure the processor power module by pushing it into the socket.

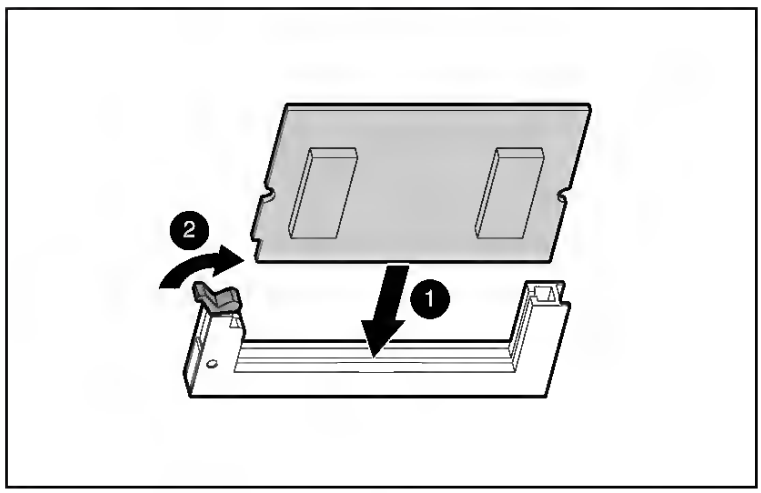

Figure 4-13. Installing the Cache Accelerator

6. If there are more than four processors installed, install a second Cache Accelerator module as in step 5.
7. Replace the air baffle and fasten the thumbscrew.
8. Replace the Processor and Memory module and reconnect the power cord(s).
9. Turn on the server. See Chapter 2, "Server Installation."

SDRAM Memory

You can expand computer memory by installing industry-standard Dual Inline Memory Modules (DIMMs) into the memory expansion boards. The following requirements must be met when installing additional memory:

- Supports 100-MHz Registered SDRAM 128-MB, 256-MB, and 512-MB. Will also support 1-GB DIMMs when they are available.
- Expandable to 8GB using 512-K DIMMs (16GB when 1-GB DIMMs are available)

Groups of two DIMMs of the same size, type, and speed must be installed or removed at a time (the eight groups on the memory board are referred to as banks 1 through 8).

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CAUTION: Use only Compaq DIMMs. DIMMs from other sources may affect data integrity adversely.

To install more memory, refer to one of the following installation sources:

- For a detailed text and illustrated procedure, refer to the documentation provided with the DIMM option kit.
- For an illustrated overview of the installation procedure, refer to the *Hardware Installation and Configuration* poster included in the shipping box and on the label located on the inside of the Processor and Memory module.
- For an overview of memory installation, see the following procedure.

Adding or Replacing Memory

The memory board connects to the processor board, which is located inside the Processor and Memory module. To remove a memory board:

1. If the server is on, place it in Standby. See Chapter 2, "Server Installation."
2. Slide the Processor and Memory module out of the server until it reaches the stops. See Chapter 3, "Server Operation."

WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

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3. Remove the memory board by rotating the ejectors outward ❶ and pulling the board out ❷.
4. Place the memory expansion board, components facing up, on a flat surface.

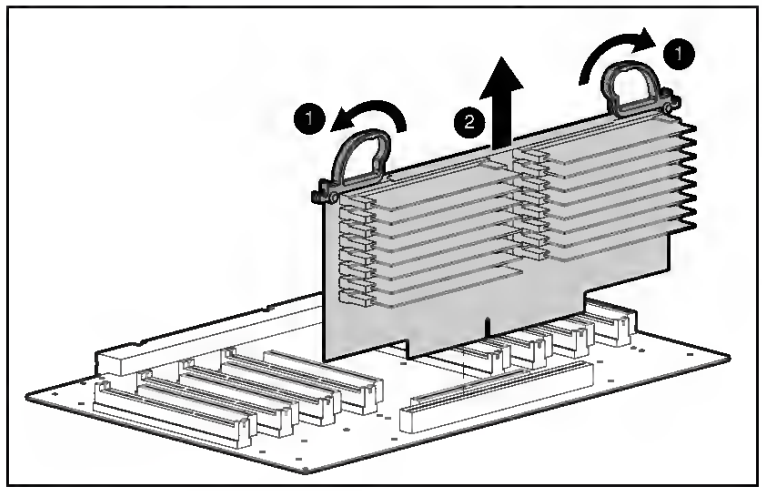

Figure 4-14. Removing the memory board

NOTE: The memory board is part of the system interconnect scheme and must be seated properly for server start up. For more information see the "System Interconnect Status Indicators" section in Chapter 3, "Server Operation."

CAUTION: The ejectors prevent the memory expansion board from lying completely flat. Inserting a DIMM without counter pressure applied behind the socket to the back of the expansion board can cause the memory expansion board to flex and could result in damage. Always support the memory expansion board or apply counter pressure while inserting a DIMM.

5. Open the DIMM socket latches ❶ as shown in the following figure.
6. Align the key slot on the bottom edge of each DIMM with the tab in the DIMM socket.

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7. Insert each DIMM ❷ directly into the socket until the module is properly seated.

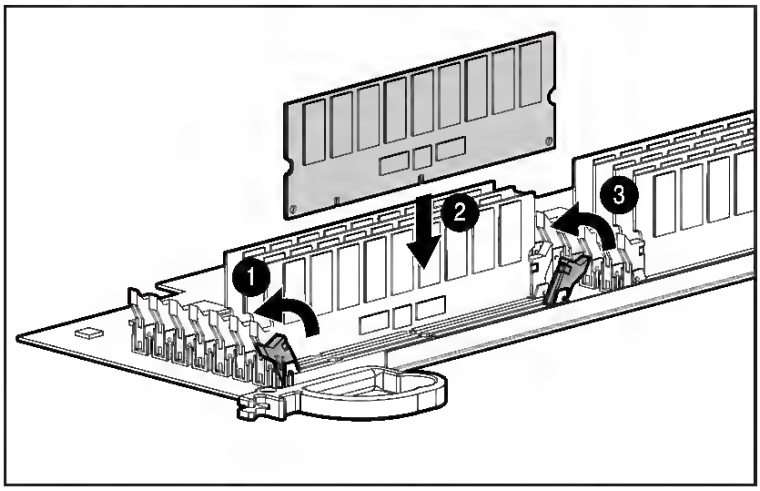

Figure 4-15. Installing DIMM memory module in memory board

8. Secure the DIMM by closing the socket latches ❸.
9. Verify that the two DIMMs inserted are both within the same bank by observing the bank boundaries outlined on the surface of the memory expansion board.

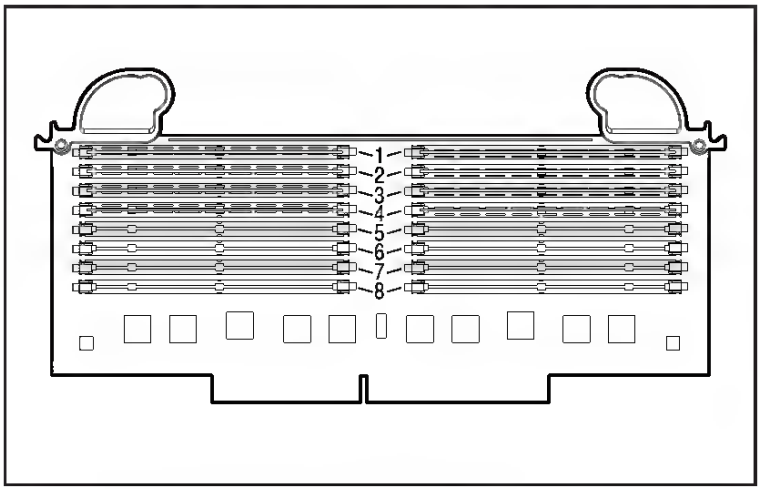

Figure 4-16. Location of DIMM sockets for Banks 1-8

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10. Replace the memory expansion board and Processor and Memory module by reversing steps 1 through 3.
11. Turn on the server. See Chapter 2, "Server Installation."
12. If the server does not power up, verify that system interlock LEDs are normal. See Table 3-2, "System Interconnect Status Indicators" in Chapter 3, "Server Operation."
13. Verify that the memory was installed correctly by reviewing the POST messages on the system console or memory information under the System Information Menu of the IMD. See Chapter 6, "Integrated Management Log."

Mass Storage

The following sections provide overviews for installing hard disk drives, CD-ROM drives, and external storage devices.

The ProLiant 8500 supports up to four 1-inch, Ultra2, Single Connector Assembly (SCA), hot-plug hard drives.

The server ships with the media module occupied by a diskette drive and slimline CD-ROM drive. An Integrated Management Display (IMD) is included on some models.

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The following illustration shows the media module populated with four 1-inch hard drives ❶-❹, IMD ❺, a diskette drive ❻, and a CD-ROM drive ❼ installed.

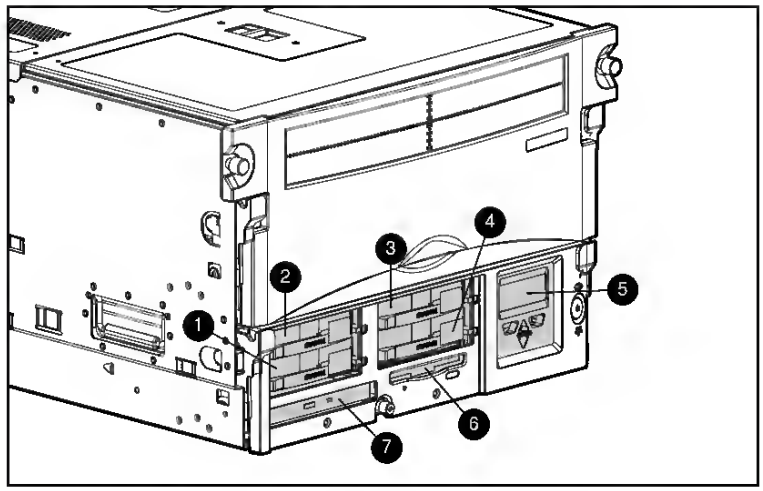

Figure 4-17. Four 1-inch hot-plug hard drives installed in media module

❶ Hot-plug hard drive, SCSI ID #0

❷ Hot-plug hard drive, SCSI ID #1

❸ Hot-plug hard drive, SCSI ID #3

❹ Hot-plug hard drive, SCSI ID #2

❺ Integrated Management Display, if installed

❻ Integrated Diskette drive

❼ Integrated CD-ROM drive

CAUTION: If a hard drive is removed, a blanking panel must be added for static immunity and airflow integrity.

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SCSI Hard Drive Installation Guidelines

The following guidelines should be noted when adding SCSI hard drives:

- A maximum of four 1-inch, Ultra2 SCSI drives may be added in the media module.
- If only one SCSI hard drive is used, it should be installed in the lowest numbered bay. If several drives are installed, the system boot drive should be installed in the lowest numbered bay.
- In order to maintain proper system cooling, blanking panel should be installed in unused drive bays.

The server has one embedded Integrated Smart Array Controller (Ultra2 support). The integrated controller is hardwired through an array-enabler board to the four SCSI hard drive bays and the external SCSI connector that can be used for a tape backup unit.

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Installing a Hot Plug SCSI Hard Disk Drive

CAUTION: Before adding or removing any hot-plug SCSI drives, consult your operating system instructions. Failure to do so could result in loss of data or damage to equipment.

To install a hot-plug SCSI hard drive:

1. Remove the blanking panel in an unused drive bay by pushing the side of the retaining clip inward ❶, then pulling the blanking panel outward ❷.

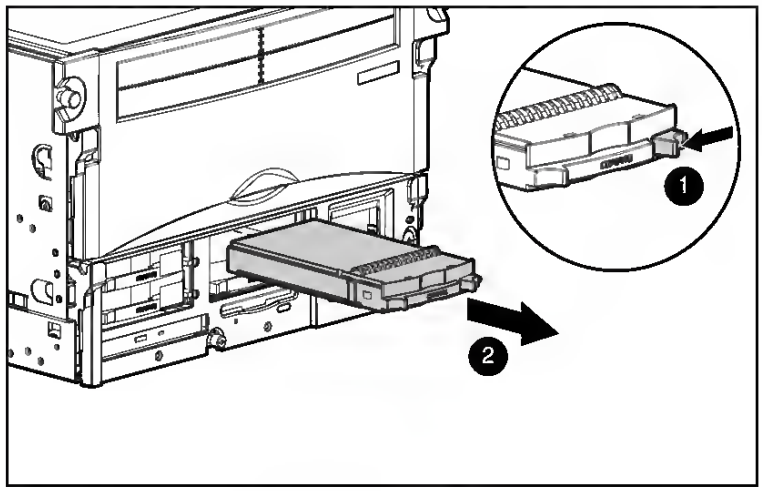

Figure 4-18. Removing a hard-drive blanking panel

2. Push the release button on the left of the new drive and rotate the hot-plug drive ejector lever outward to unlock.

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3. Insert the hot-plug drive into the empty drive bay, pushing until securely seated ❶.
4. Secure the hot-plug drive in the drive cage by swinging the ejector lever inward ❷, as shown below.

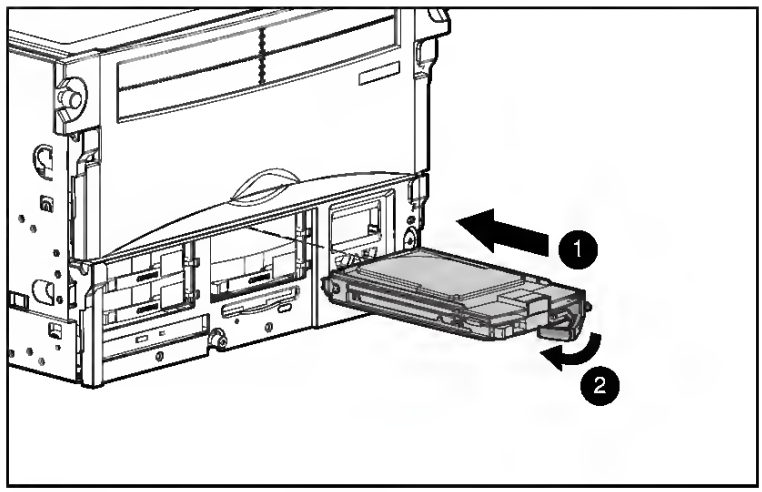

Figure 4-19. Installing a SCSI hard drive

CAUTION: Before removing any hot-plug hard drive, read the important guidelines in the following two sections.

5. To remove a hot-plug SCSI hard drive, push the release button on the left of the drive and rotate the hot-plug drive ejector lever outward to unlock. Pull the drive out of the drive bay.

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Hot-Plug SCSI Hard Drive Indicators

The Hot-Plug SCSI hard drives used with ProLiant 8500 servers have three LEDs that indicator the status of the drives: ❶ - Activity, ❷ - Power/Online, and ❸ - Fault. These indicators are shown in the following figure. The following table explains how to interpret the indicators.

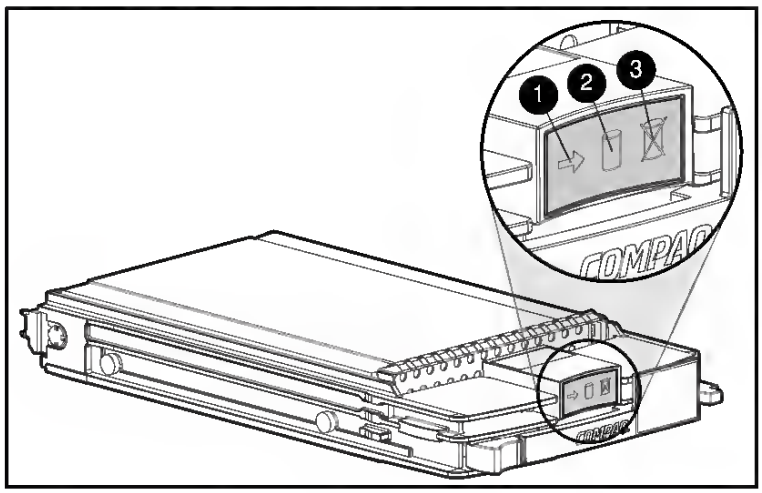

Figure 4-20. Hot-Plug SCSI hard drive indicators

Table 4-3
Interpreting Hot-Plug SCSI Hard Drive Indicators

❶	❷	❸	Indicator Meaning
Off	Off	Off	OK to remove drive if not part of a fault-tolerant configuration
Off	Off	On	OK to remove failed drive
X	On	X	*Drive is online - do not remove drive*

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Important Guidelines About Replacing Hot-Plug SCSI Hard Drives

When replacing hot-plug hard drives in a fault-tolerant configuration, these guidelines must be followed:

- **Never remove a hot-plug drive if the Online LED is green**. Replace a hot-plug hard drive only when the drive's Fault LED is amber, indicating a failure.
- **Never remove more than one drive at a time.** When a drive is replaced, the controller uses data from the other drives in the array to reconstruct data on the replacement drive. If more than one drive is removed, a complete data set is not available to reconstruct data on the replacement drive(s).
- **Never remove a working drive when another drive has failed.** Drives that have been failed by the controller are indicated by the amber *Drive Failure* LED on the drive tray. Permanent data loss will occur if a working drive is removed when replacing a failed drive.
- **Never remove a drive while another drive is being rebuilt.** A drive's *Online* LED will be flashing green whenever it is being rebuilt. A replaced drive is restored from data stored on the other drives.
- **Never turn a ProLiant Storage System off while the server controlling it is powered on.** Doing so will cause the server's Smart Controller to mark the drives as "failed." This could result in permanent data loss.
- **If an online spare drive is installed, wait for it to complete rebuilding before replacing the failed drive.** When a drive fails, the online spare will become active and begin being rebuilt as a replacement drive. After the online spare has been completely rebuilt (*Online* LED will be solid green), the failed drive should be replaced with a new replacement drive. **Do not** replace the failed drive with the online spare.
- **A POST error message will occur when the system is turned on if a drive(s) has been replaced while the system is OFF.** When this occurs you will be prompted to:

  PRESS <F1> TO BOOT THE SYSTEM AND REBUILD THE REPLACED DRIVE , OR

  PRESS <F2> TO BOOT THE SYSTEM AND NOT REBUILD THE DRIVE(S).

CAUTION: Pressing **F2** will cause permanent data loss to the entire logical drive. **F2** should be pressed only if all of the drives have been replaced or if complete data loss is desired.

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NOTE: When a drive configured for fault tolerance is replaced, the replacement drive will automatically begin restoring when it is installed. When a drive is in the process of being restored, the *Online* LED will flash green. The LED will continue to flash until the drive is completely restored.

External Storage Devices

Optional mass storage devices can be connected to the ProLiant 8500 by installing a PCl expansion board with an external connector.

For information on attaching to PCI expansion boards refer to the *ProLiant SCSI Cabling Guide*. For information on adding or removing PCl Hot Plug Expansion Boards see the "Adding Expansion Boards" section later in this chapter.

To install an external storage device, refer to the installation documentation that came with the external storage device. The following illustration provides only an overview of this installation.

1. If the server is on, place it in Standby mode and disconnect the power cord(s). See Chapter 2, "Server Installation."
2. If the external storage device is on, disconnect the power.
3. Connect one end of the SCSI cable to the external Very High Density connector on the rear panel of the server.
4. Connect the other end of the SCSI cable to the appropriate external SCSI connector on the rear panel of the external storage device.

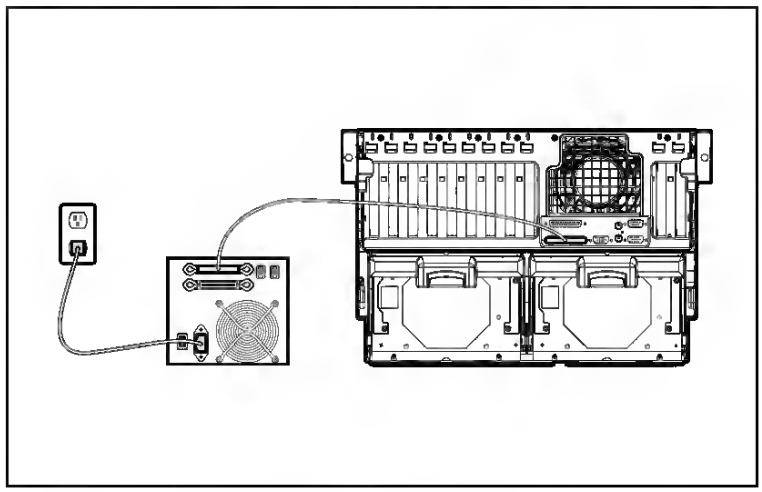

Figure 4-21. Connecting the external mass storage device

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5. Reconnect the power cords if removed and take the computer out of Standby. See Chapter 2, "Server Installation."
6. Restore power to the external storage device.
7. To configure the device, run the System Configuration Utility. Refer to the Server Setup and Management pack shipped with your server to run the System Configuration Utility.

I/O Expansion Boards

The ProLiant 8500 server supports PCl Hot Plug. PCI Hot Plug and the server's operating system work together to allow the following hot-plug actions:

- **Hot-replacement of adapters** - This feature allows you to replace a failed adapter with an identical adapter without powering down the server.
- **Hot-addition of adapters** - This feature allows you to install new PCI expansion boards in previously empty slots without powering down the server under some operating systems.
- **Hot upgrade of adapters** - This feature allows you to replace an adapter with a different adapter without powering down the server.

PCl Hot Plug is backward compatible, though system components fit into one of two categories; hot-plug aware or non-hot-plug aware. The following are required in the server for complete PCI Hot Plug capability:

- PCI Hot Plug system hardware (available in this server)
- Operating system with PCI Hot Plug support (currently Windows NT, NetWare, and SCO UNIX)
- PCI Hot Plug device drivers (available from operating system vendors, Compaq SmartStart CD, and some individual hardware vendors).

WARNING: To reduce the risk of personal injury from Hazardous Energy or damage to the equipment when working on energized servers:

- Remove all watches, rings, and any other loose fitting jewelry.
- Avoid the use of conductive tools that could bridge live parts.

IMPORTANT: If any of the three required components are not hot-plug aware, the system is fully functional, though not PCI Hot Plug capable.

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Locating the I/O Expansion Slots

The I/O expansion slots are located in the I/O Module, and are accessed by sliding the server out of the rack and opening the top access panel as described in Chapter 3, "Server Operation."

WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

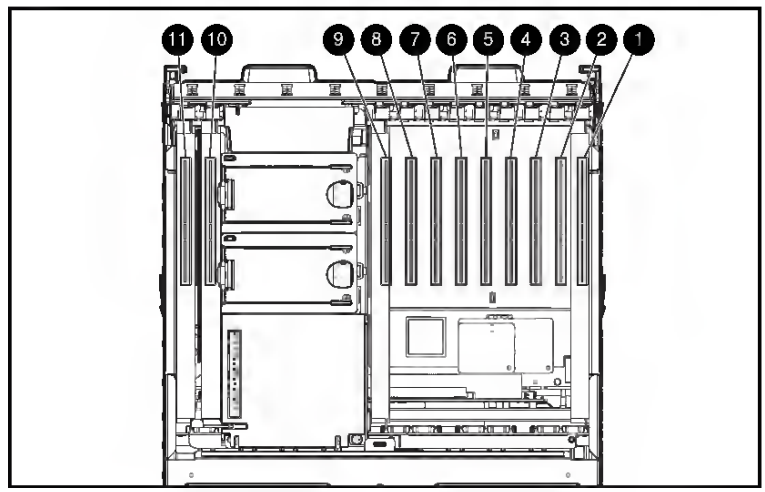

Figure 4-22. Top view of I/O slots

The I/O expansion slots are distributed among three I/O buses. For more information about these buses, refer to the section titled "Bus Distribution" later in this chapter.

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PCI Hot Plug LEDs

The PCI Hot Plug amber LED ❶ and green LED ❷ indicators (shown in the following figure for one slot) provide a visual reference of the status of each slot. The LEDs are viewed from the rear of the server or by opening the top access panel.

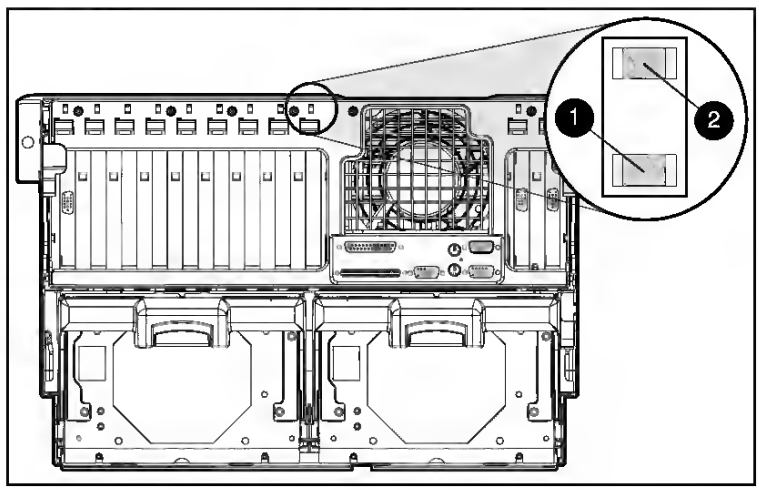

Figure 4-23. PCI Hot Plug LED indicators from rear of server

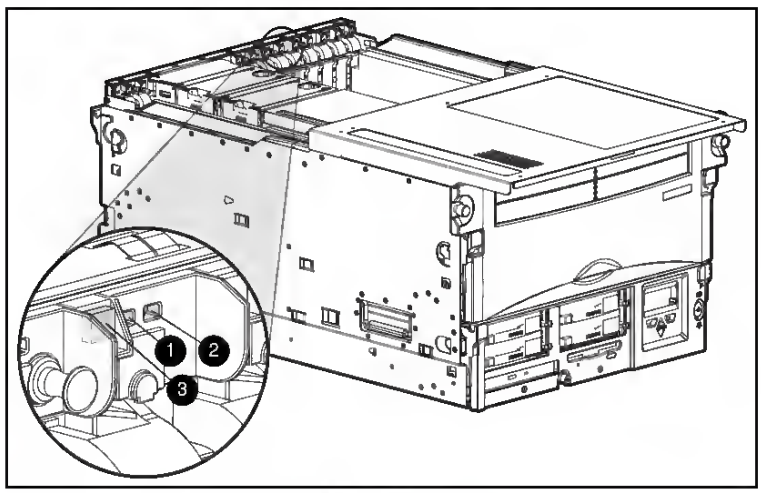

Figure 4-24. PCI Hot Plug LED indicators in the I/O Module

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Each PCI Hot Plug Button ❸ is used to activate or deactivate its associated PCI Hot Plug slot. Activating or deactivating a PCI Hot Plug slot can also be accomplished through the operating system PCI Hot Plug software application. For more information on the PCI Hot Plug software application, see "PCI Hot Plug Operating System Support" in the following section, and the PCI Hot Plug Important Facts in the online *PCI Hot Plug Administration Guide* on the Systems Reference Library CD.

Table 4-4 indicates the appropriate slot condition and status for each state of the two LEDs.

Table 4-4
PCI Hot Plug LED Indicators

Amber LED	Slot Status	Green LED	OK to Open	Slot Status
Off	Slot does not require attention	On	No	Power is applied to slot.
On	Slot requires attention. There may be a problem with the slot, the PCI board, or the driver. Check the green LED before opening the slot.	Flashing	No	Power to slot is being turned OFF or ON. This process may take several minutes. DO NOT open the slot release lever until the green LED is completely off.
X		Off	Yes	You can replace or remove board in this slot only.

PCI Hot Plug Operating System Support

Software support is an integral part of PCI Hot Plug. Compaq, in partnership with Microsoft, Novell, and SCO, has developed PCI Hot Plug software support for each operating system.

You can use either the PCI Hot Plug Button on the server or your operating system PCI Hot Plug software to control the PCI Hot Plug slots. You can use the software to indicate that you want to replace a card in the hot-plug slot or configure a board that you have already added to the system. The PCI Hot Plug software also allows you to enable or disable specific slots in the system.

NOTE: IBM OS/2, Sun Solaris, and Banyan Vines do not support PCI Hot Plug.

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Microsoft Windows NT 4.0

Supported PCI Functionality

Compaq PCI Hot Plug support under Microsoft Windows NT 4.0 provides hot-replacement for Compaq boards. An adapter equipped with a hot-plug aware device driver can be replaced without shutting down the system. If the adapter is part of a redundant pair, the failed adapter can be replaced while users continue to communicate with the server through the additional adapter. Once an adapter has been replaced, PCI Hot Plug technology enables you to bring the PCI slot back into service.

NOTE: Under the current version of Windows NT 4.0, hot-addition is not possible. Empty slots are powered up at boot and opening the slot release lever will cause the slot to be powered off. If you add a board in this manner, you will not be able to power up the slot.

Software Components

The software components include the Compaq PCI Hot Plug Utility, the Compaq Remote Monitor service (CPQRCMC), the Compaq Systems Management driver (SYSMGMT.SYS), and hot-plug aware drivers.

The Compaq PCI Hot Plug Utility allows you to monitor and control PCI Hot Plug slots. You can accomplish the following tasks:

- View the current power and fault status of all PCI Hot Plug slots in the system.
- Turn the power on and off to a slot to permit controller replacement.
- View the name, driver name, paired state, and status information about the controller in a slot.
- Manage the hot-plug slots of the remote system, as well as the local system.

The Compaq Remote Monitor Service (CPQRCMC) is central to the operation of PCI Hot Plug technology. CPQRCMC acts as the connection point for all hot-plug communications. By using the CPQRCMC service as the primary interface, Compaq delivers true PCI Hot Plug capability without requiring hot-plug support directly in the Windows NT operating system.

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Installing PCI Support

Compaq Support Software for Microsoft Windows NT 4.0 (NT SSD), version 2.0 or later, contains all the software components to support Compaq PCI Hot Plug. Included on the NT SSD are hot-plug aware device drivers, such as Compaq NC 3131 Controllers and the Smart Array 3200 Controller. The NT SSD also provides the PCI Hot Plug Utility, Hot Plug service, and the System Management driver.

The significant points to consider when installing Windows NT on a PCI Hot Plug system are:

- Automatic device detection may not yield results consistent with actual hardware configuration. Confirm the auto detect by looking at the hardware.
- The presence of multiple network adapters may complicate the network setup phase.
- PCI Hot Plug technology for Windows NT 4.0 relies on the presence of the Windows NT Remote Procedure Calls (RPC) service. For more information see the Windows NT documentation.
- PCI Hot Plug technology for Windows NT 4.0 requires installation of the Compaq SSD for Windows NT to provide updated drivers, utilities, and operating system support code.

For more information on Windows NT Support for PCI Hot Plug Technology, refer to the PCI Hot Plug Administration Guide on the Compaq Systems Reference Library CD, the Microsoft online help file, or the Compaq technology brief "Deploying PCI Hot Plug on Compaq Servers in a Microsoft Windows NT Environment" on the Compaq website: www.compaq.com.

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Novell NetWare

Supported PCI Functionality

Compaq PCI Hot Plug support under Novell NetWare provides hot-replacement, hot-upgrade, and hot-addition for most PCl adapters. To protect hardware investments, the Novell PCI Hot Plug architecture leverages the modularity of NetWare to minimize the changes required of third-party adapter board software. To take advantage of PCI functionality, networking and storage device drivers must be written to current specifications. The NetWare Peripheral Architecture (NWPA) specifies the driver architecture for storage devices. The Novell Open Data-Link Interface (ODI) specification documents the driver architecture for network devices. Drivers that are compliant with these specifications will be compatible with PCl Hot Plug and will continue to work in non-hot-plug environments.

Software Components

Novell uses a central component, the Novell Event Bus, to facilitate communications between different software modules. The Event Bus is implemented as a NetWare Loadable Module (NLM), allowing you to implement PCI Hot Plug on existing versions of NetWare. Listed below are the components of the PCI Hot Plug architecture for NetWare:

- Novell Event Bus (NEB)
- Novell Configuration Manager (NCM)
- OEM Specific System Bus Driver (SBD)
- Novell Configuration Manager Console (NCMCON)
  - Device drivers
  - Other boards
  - Installation tools

Installing PCI Support

Compaq provides PCI Hot Plug support for NetWare via the Novell Software Support Diskette.

For more information, refer to the PCI Hot Plug Administration Guide on the Compaq Systems Reference Library CD, the NetWare online documentation, or the Compaq White Paper "Hot Plug Expansion on Compaq Servers in Novell NetWare Environments" (located at www.compaq.com).

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SCO UnixWare

Supported PCI Functionality

Compaq support of PCI Hot Plug under UnixWare 7.01 provides hot-replacement, hot-upgrade, and hot-addition for a variety of boards. You can eliminate downtime when you replace faulty adapters, upgrade your systems, and dynamically add new adapters.

Software Components

The primary software components for hot-plug support include:

- Hot-plug user interface Admin Manager
- Hot-plug Controller interface
- Netscape AutoConfig Subsystem
- Hot-plug system and device drivers
- Device Driver Interface (DDI-8) specification

The Admin Manager is the graphical user interface for PCI Hot Plug technology. All user commands to add, remove, or replace an adapter funnel through the Admin Manager. The Hot Plug Admin Manager is incorporated into SCO's existing system-managed framework called SCO Admin.

The Hot Plug Controller interface tracks system component information as well as manages the actions required for hot-plug functions. The Hot Plug Controller Interface processes Hot Plug Services Library (HPSL) requests by interfacing with the Netscape AutoConfig Subsystem. Using the existing Compaq Support Software 2.1, auto-configuring framework hot-plug events will be handled through the resource manager database, which has been updated specifically in the area of dynamically loading and unloading individual device drivers.

The device driver interface specification defines how device drivers communicate with the UnixWare operating system and hot-plug software. SCO's Device Driver Interface version 8 (DDI-8) and other device driver interfaces are enhanced to provide the functions for adding or removing driver instances and suspending or resuming operation in conjunction with hot-plug operations.

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Installing PCI Support

Compaq Enhanced Functionality Support (EFS) diskettes for Unix contain all the software components to support Compaq PCI Hot Plug.

For more information, refer to the PCI Hot Plug Administration Guide on the Compaq Systems Reference Library CD, the UnixWare online documentation, or the Compaq White Paper "PCI Hot Plug Technology with SCO SoftwareArchitecture" found on the Compaq website at www.compaq.com.

For further information on the PCI Hot Plug Button and PCI Hot Plug software, see the PCI Hot Plug Important Facts in the online PCI Hot Plug Administration Guide on the Systems Reference Library CD.

Supported I/O Expansion Boards

The I/O board of the ProLiant 8500 has eleven PCI Hot Plug expansion slots. These slots are distributed among three PCI buses as shown in Table 4-4. The ProLiant 8500 server is shipped with a Network Interface Controller (NIC) in a slot on bus 1.

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Bus Distribution

The I/O board in the ProLiant 8500 uses two 33-MHz PCI buses and one 66-MHz bus. The following figure and table identifies the PCI expansion slots associated with each of the three PCI buses. Bus balancing is not required.

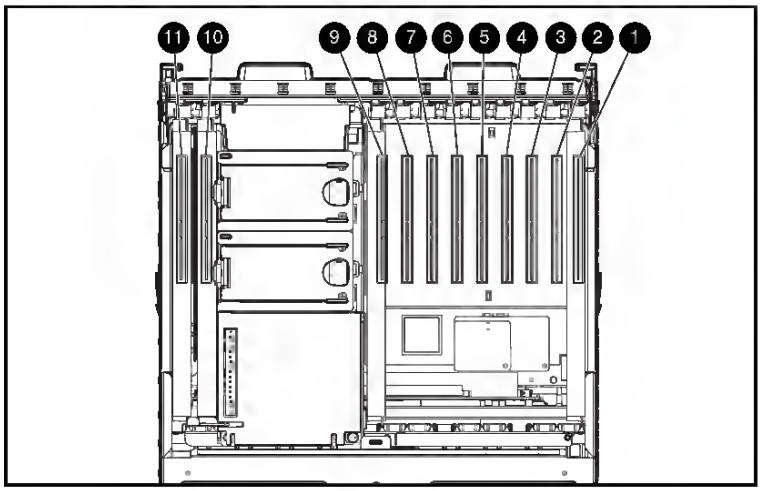

Figure 4-25. PCI bus slot numbers

Table 4-5
Bus Distribution of PCI Hot Plug Slots

Bus Number	Associated PCI Bus	PCI Hot Plug Slot No.
1	PCI Bus 1 (64-Bit), 33-MHz	Slots ❼ through ❾
2	PCI Bus 2 (64-Bit), 33-MHz	Slots ❶ through ❻
3	PCI Bus 3 (64-Bit), 66-MHz	Slots ❿ and ⓫

Adding Expansion Boards

Non-Hot Plug Expansion Boards

You can use non-hot plug expansion boards in the ProLiant 8500 server, but you must install them according to the following procedure.

1. Back up your server data.
2. Shut down the operating system in an orderly manner as directed in your operating system instructions.

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3. Power down the server.
4. Slide the I/O Module out and open the top access door.
5. Install the expansion board.
6. Close the top access door and slide the I/O Module into the server.
7. Power up the server.
8. Run the System Configuration Utility as described in Chapter 6, "Server Configuration."

Hot Plug Expansion Boards

The PCI slots of the ProLiant 8500 I/O board are Hot Plug capable and support a variety of industry-standard expansion boards. For details, see "Supported I/O Expansion Boards" later in this chapter.

NOTE: Under the current version of Windows NT 4.0, hot-addition is not possible. Empty slots are powered up at boot and opening the slot release lever will cause the slot to be powered off. If you add a board in this manner, you will not be able to power up the slot.

Use the following procedure to add a PCI expansion board into PCI Hot Plug slots 1 through 11. See Figure 4-23, Figure 4-24, and Table 4-3 for definitions of the PCI Hot Plug LEDs.

1. Open the top access door.
2. If the slot PCI Hot Plug green LED is on, power down the slot by using the slot PCI Hot Plug Button or PCI Hot Plug software application. Wait until green LED is off.

NOTE: The PCI Hot Plug Button allows you to press the button again within five seconds of the first press to cancel the action.

CAUTION: DO NOT open the slot release lever unless the slot's green PCI Hot Plug LED indicator is off. System power down and subsequent data loss could occur.

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3. Press on the top ❶ of the appropriate expansion slot release lever and open the lever toward the rear ❷ of the expansion slot.
4. Remove the expansion slot cover ❸.

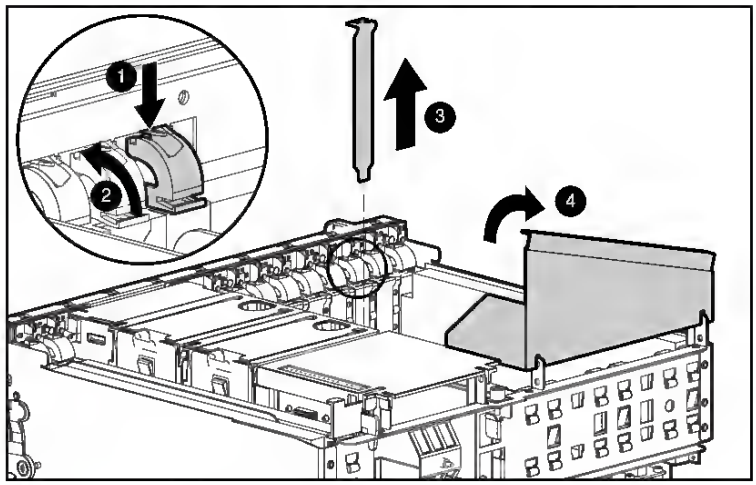

Figure 4-26. Preparing the hot-plug expansion slot for installation

5. Open the air baffle ❹.
6. Insert the PCI expansion board into the appropriate expansion slot, pushing firmly until securely seated.

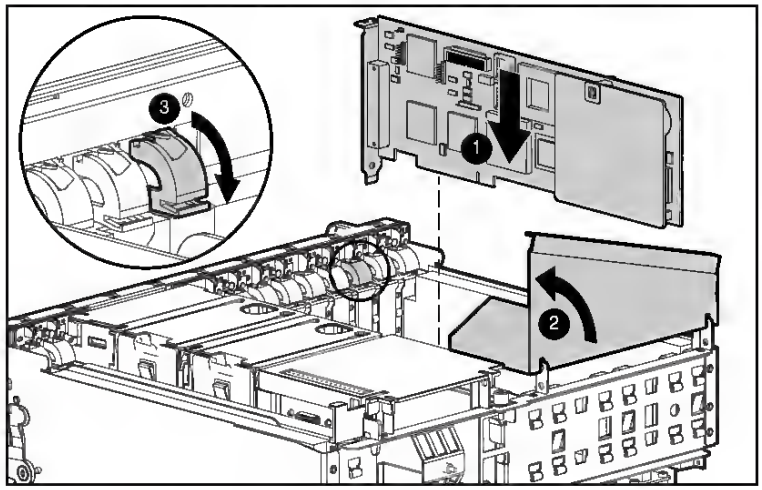

Figure 4-27. Inserting the PCI expansion board

7. Connect the expansion board I/O cable as appropriate.

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8. Close the expansion slot release lever from the rear of the unit to secure the board. Make sure that the lever latches into the closed position.
9. To keep the full-length expansion boards fully seated, be sure the L-shaped slot keeper tabs on the plastic expansion board guide are positioned over the forward end of the expansion board. Using the slot keepers is especially important when expansion boards are added or the server is moved.
10. Activate power to the slot through the PCI Hot Plug software application or by pressing the PCI Hot Plug Button ❸ above with the corresponding I/O expansion slot.

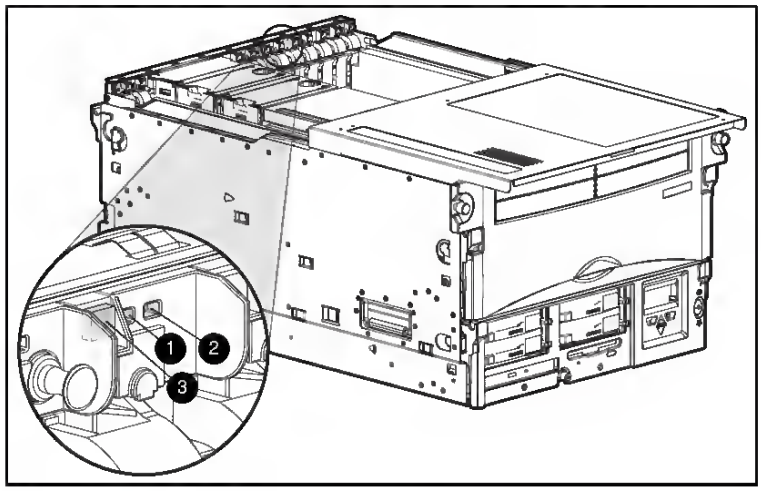

Figure 4-28. Activating the PCI Hot Plug Button

11. Review the amber LED ❶ and green LED ❷ indicators for slot status. The green LED will flash during the power up transition and will turn on when power up is complete. For details of PCI Hot Plug LED indicators, see "PCI Hot Plug LEDs" earlier in this chapter.
12. Close the top access panel.

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Removing or Replacing a PCI Hot Plug Expansion Board

1. Open the top access door.
2. Use the PCI Hot Plug Button or software application to turn power off to the slot. The green LED will flash during the power down transition and will turn off when power down is complete. For details of PCI Hot Plug LED indicators, see "PCI Hot Plug LEDs" earlier in this chapter.

CAUTION: DO NOT open the slot release lever unless the slot's green PCI Hot Plug LED indicator is off. System power down and subsequent data loss could occur.

3. When the slot's green LED is off, disconnect cables to the PCI board.
4. Open the slot release lever and the L-shaped slot keeper.
5. Remove or replace the board.
6. If only removing the board, install an expansion slot cover.
7. If replacing the board, connect the cables to the PCI board.
8. Close the slot release lever. Ensure that the lever latches into the closed position.
9. If replacing, return power to the slot through the PCI Hot Plug Button or application. The green LED will flash during the power up transition and will turn on when power up is complete. For details on PCI Hot Plug LED indicators, see "PCI Hot Plug LEDs" earlier in this chapter.
10. Close the top access panel.

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Replacing Hot Plug Fans

The ProLiant 8500 server ships with two hot-plug fans. Fan 1 is closest to the rear of the server. Each fan has LEDs that indicate the status of the fan as follows:

- No light - power is not applied to the fan
- Green light ❶ - power is applied to the fan and fan is functional
- Amber light ❷ - fan has failed

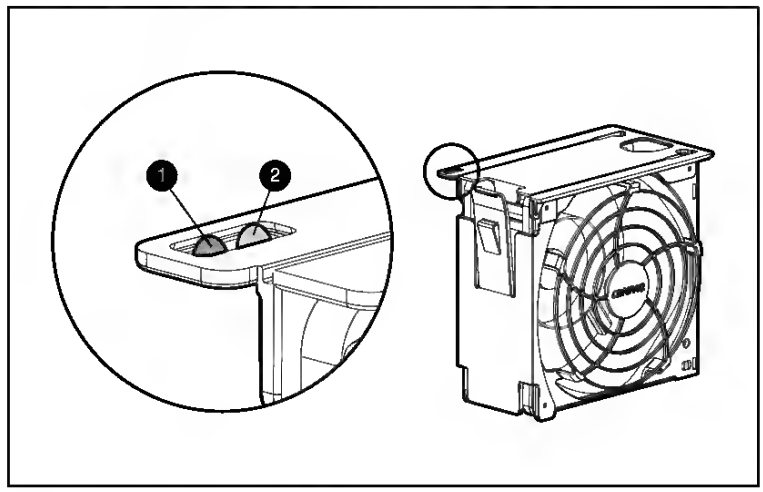

Figure 4-29. Hot-plug fan LED indicators

NOTE: The hot-plug fan LEDs are not part of the fan housing. The figure above shows the LEDs as if the fan were installed in the server.

CAUTION: Never remove both hot-plug fans while the server is powered up. Overheating and damage to hardware could result. If the appropriate Compaq software drivers are installed, the operating system software will initiate a power shutdown in the event of overheating.

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1. Open the top access door.
2. Press the locking latches in ❶ and lift the failed hot-plug fan (either 1 or 2) out of the I/O Module ❷.

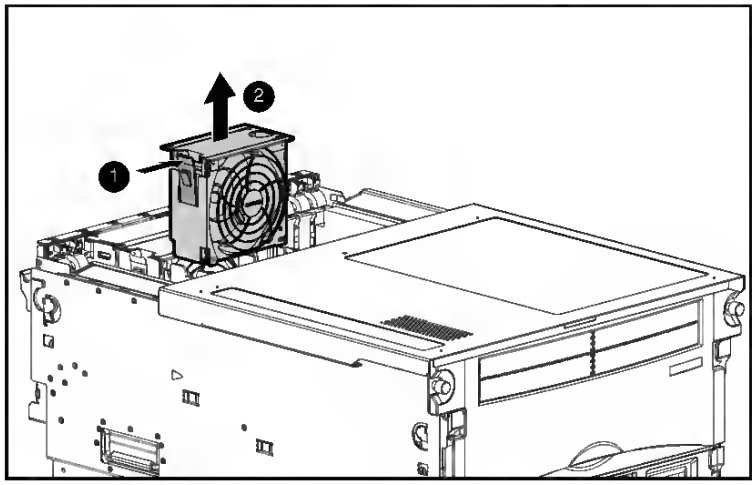

Figure 4-30. Removing hot-plug I/O Fan 2

3. Lower the new hot-plug fan into the I/O Module until it rests on the I/O board connector ❶, holding the locking latches ❷. Push the fan into the connector and release the locking latches to engage the fan.

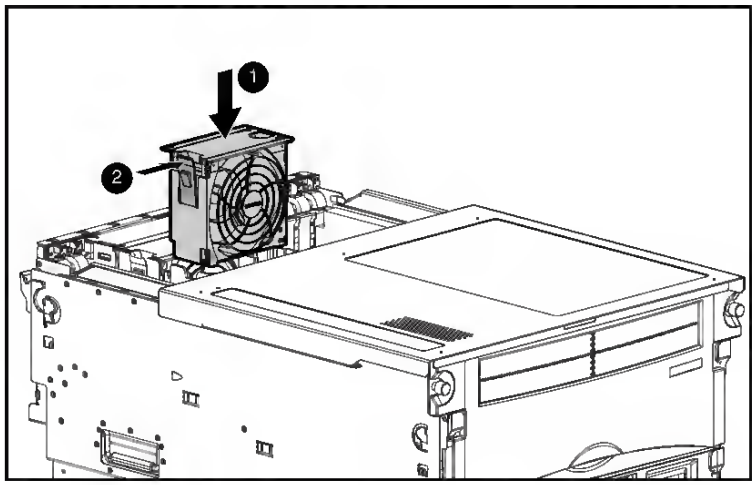

Figure 4-31. Installing a new hot-plug fan 1

4. Verify that the fan is producing airflow and that the LED is green.
5. Close the top access door.

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Chapter 5

SCSI Setup

This chapter describes the features and set up of the ProLiant 8500 server Integrated Smart Array Controller (Ultra2 support) .

Features

The ProLiant 8500 Dual Channel Integrated Smart Array Controller is a dual Ultra2 SCSI array controller. Both channels support Low Voltage Differential (LVD) SCSI devices. The controller supports the following features.

- 16 MB total memory, 12 MB Read Ahead Cache
- Support for up to four internal Ultra2 SCSI Hot-Plug drives in RAID 0, 1, 0+1, and 5
- External connector supports external tape drives for backup of the internal drives
- Migration from any RAID level to any RAID level
- Migration from any stripe size to any stripe size
- PreFailure notification and PreFailure Warranty (through Compaq Insight Manager)
- On-line spares

Port 2 is dedicated to controlling the SCSI drives in the internal drive bay. Port 1 is connected to an external Very High Density Connector Interface (VHDCI) SCSI connector.

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The location of the external connector for Port 1 is shown in the following figure.

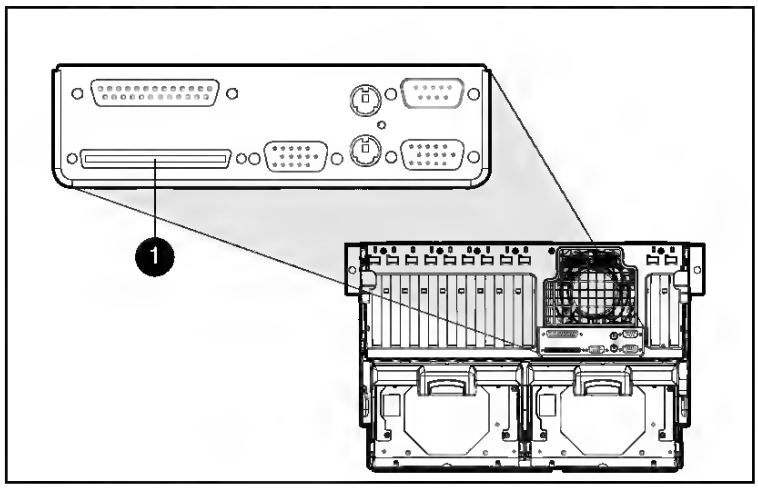

Figure 5-1. External SCSI Connector ❶

If you wish to use a SCSI controller other than the integrated controller for the internal hard drives, you can bypass the internal controller using the Integrated Array Bypass Kit and an optional controller such as the Compaq 3200 Array Controller. See the following section, "Installing the Integrated Array Bypass" for installation instructions.

For external RAID support, use an array controller such as the Compaq 3200 Array Controller.

The Option ROM-based Array Configuration Utility is used to help you configure the hardware in the way that best suits your needs.

CAUTION: It is recommended that any time you move drive arrays or change your configuration you should back up the data.

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Installing the Integrated Array Bypass

This document describes the installation of the Compaq ProLiant 8500 Integrated Array Bypass kit. Use this kit if you want to bypass the Integrated Smart Array Controller (Ultra2 support) and use an optional controller such as the Compaq 3200 Array Controller.

WARNING: To reduce the risk of personal injury or damage to the equipment, refer to Chapter 4, "Installing Hardware" and observe all safety precautions and option installation instructions.

The Integrated Smart Array Controller is routed to the internal drives and the external SCSI connector through a daughter board, the Array Enabler Board, in the I/O Module.

The Integrated Array Bypass kit allows you to replace the Array Enabler Board with a connector and cable that you can connect to an optional controller board such as the Compaq 3200 Array Controller.

CAUTION: It is recommended that any time you move drive arrays or change your configuration you should back up the data.

WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

Procedure

1. If you have not powered up the server for the first time, skip to step 4. If you have powered up the server, back up your server data.
2. Shut down the operating system in an orderly manner as directed in your operating system instructions.
3. Power down the server.
4. Open the top access panel as shown in Chapter 2, "Server Installation".

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5. Remove the Array Enabler Board as shown in the following figure.

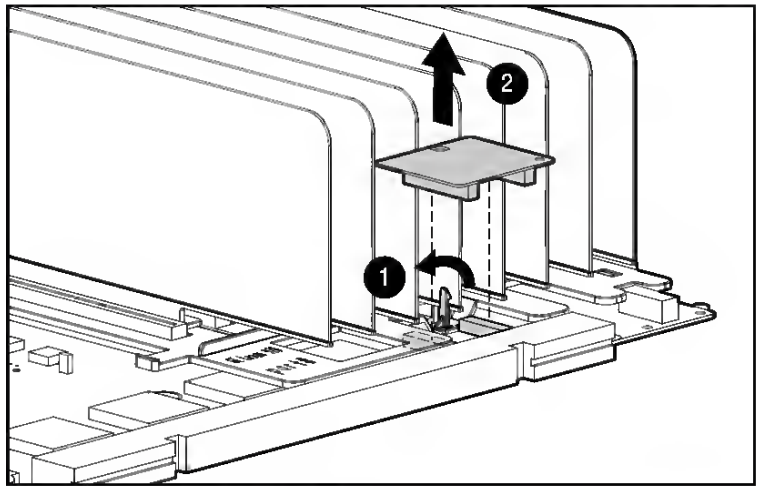

Figure 5-2. Removing the Array Enabler Board

6. Install the Integrated Array assembly as shown in the following figure.

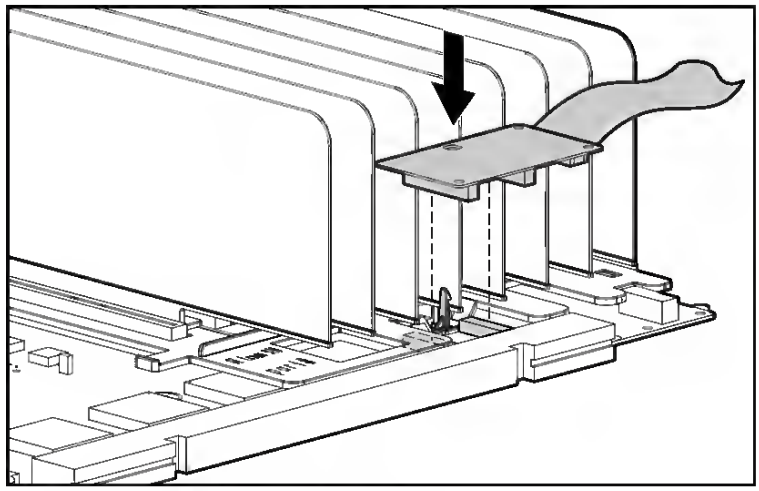

Figure 5-3. Installing the Integrated Array assembly

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7. Install the optional SCSI controller board as shown in the following figure.

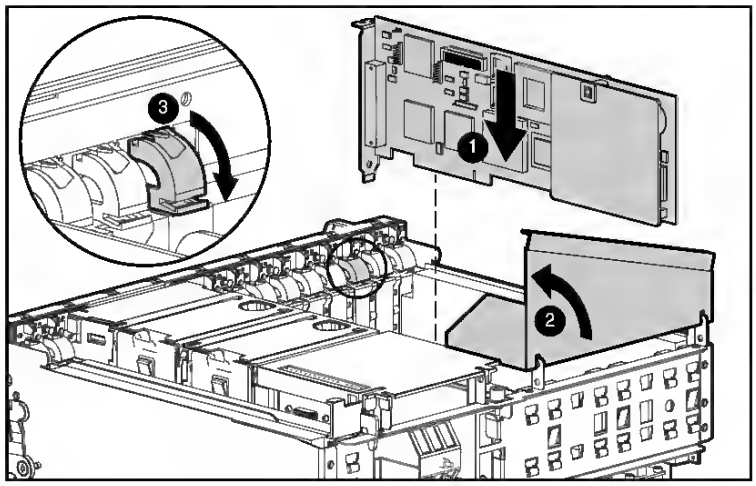

Figure 5-4. Installing the SCSI controller board

8. Connect the Integrated Array Bypass assembly cable to the optional array controller board as shown in the following figure.

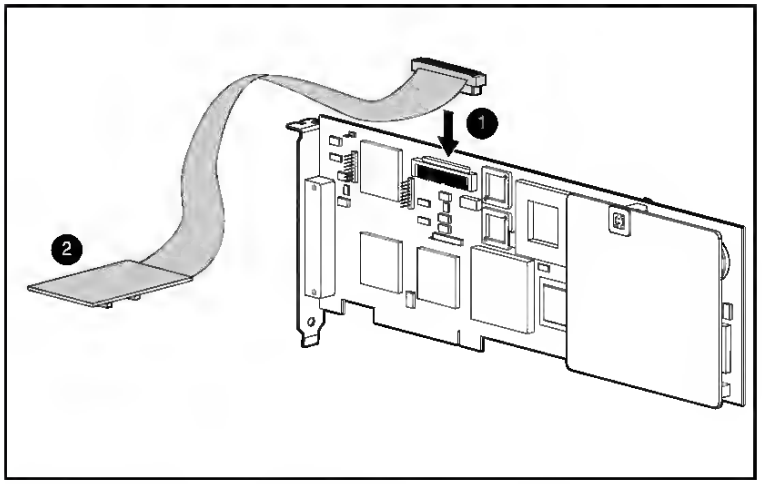

Figure 5-5. Connecting the Integrated Array Bypass assembly cable

NOTE: The actual appearance and routing of the cable in the preceding figure depends on which slot the optional array controller board occupies.

9. Close the top access panel and power up the server.
10. Configure the new controller with the ACU as described later in this chapter.

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Option ROM-Based Array Configuration Utility

The Option ROM-based Array Configuration Utility allows you to setup a simple configuration during Power-On Self-Test (POST). During POST the configuration state of the internal SCSI drives is detected. If either of the following conditions exist, the initial start screen will be displayed.

- there are no logical drives configured
- there is only one logical drive configured and there are no more than 6 physical drives attached to all of the SCSI buses supported

At the initial screen, press **Esc** to bypass the Option ROM-Based Configuration Utility. You can configure the internal drives later using the Array Configuration Utility while running SmartStart.

At the initial screen, press **F10** to run the utility.

If there are no logical drives detected, you will be prompted to indicate the operating system to be used. You are then prompted to choose the logical drive configuration. The utility will use all internal physical drives to configure one logical drive. You can change this configuration later using the Array Configuration Utility.

If there is one logical drive detected, you are offered the option to delete the configuration. Deleting the configuration will result in loss of any data on the drive. If you delete an existing configuration, you can set up a new configuration after you reboot.

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Array Configuration Utility

The Compaq Array Configuration Utility (ACU) is an easy to use graphical configuration utility to help you set up and change drive array configurations. It can be used to configure the standard internal drive controller as well as any option controller boards that you install. This utility:

- Provides a graphical view of Compaq drive array configurations
- Provides express or custom initial configuration
- Supports adding additional capacity
- Supports RAID 0, 1/0+1, and 5 fault-tolerant configurations
- Supports Raid level and stripe size migration
- Helps optimize your array configuration with configuration Wizards
- Sets drive rebuild priorities
- Allows on-line spare (hot spare) configuration
- Allows separate fault tolerance configuration on a logical drive basis

The Array Configuration Utility allows you to complete disk array configuration quickly and simply without an in-depth understand of RAID or drive array technology.

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Starting the Compaq Array Configuration Utility

The Compaq ProLiant 8500 server is shipped with the Array Configuration Utility (ACU) on the SmartStart and Support Software CD. You would normally start the utility as described in the following procedure. If, for any reason, you can not start the utility as described here, the utility is available in a variety of locations as described in a section titled "Alternate Sources of the Array Configuration Utility" later in this chapter.

11. Power off if necessary, then power on the server.
12. Boot the SmartStart and Support Software CD.
13. Select the Array Configuration Utility program.

When you start the Array Configuration Utility, the software checks the configuration of each controller and its drive arrays. If the arrays are unconfigured *or* if the configuration is less than optimal, the configuration wizard takes over to guide you through the configuration process.

On-line Help

Press the **F1** key or the click the Help button to activate context-sensitive help for each screen. A status bar at the bottom of the screen also provides immediate help messages describing the current selection.

Capacity Expansion

Capacity expansion involves adding storage capacity to an array that has already been configured. If an existing array is nearly full of data, you can expand the capacity without disturbing the existing data. The Smart Array 322DC capacity expansion feature allows the addition of a new physical drive(s) to the array.

When you run the Array Configuration Utility, the program checks the drive hardware and configuration. If the Array Configuration Utility discovers a physical drive that is not being used, the configuration wizard leads you through the steps for adding the drive.

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Capacity Extension

Logical drive extension allows you to increase the size of existing logical drives without disturbing the data on those logical drives. If an existing logical drive is full of data, you can extend the logical drive when there is free space on the array. If there is no free space on the array, you can add drives to the array and proceed to extend the logical drive.

IMPORTANT: Logical drive extension is not supported by all operating systems. Only extend logical drives that are used with an operating system that supports extension.

Extending Logical Drives — Operating Systems

The following operating systems support logical drive extension:

- Microsoft Windows NT 4.0
- NetWare 5.0
- OS/2 WarpConnect
- OS/2 WarpServer
- OS/2 WarpServer (Advanced)
- OS/2 WarpServer SMP
- OS/2 Warp 4.0
- SCO OpenServer 5
- SCO UnixWare 7
- SCO UnixWare 2

If your operating system is not listed, check your operating system documentation or contact your operating system vendor before extending logical drives.

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RAID Level and Stripe Size Migration

Use the Online RAID Level or Stripe Size Migration screen to:

- Reconfigure a currently configured logical drive to a new fault-tolerance (RAID) level
- Change an existing logical drive's stripe size to a new stripe size

Both can be done online on Windows NT 4.0 or NetWare 5.0 without causing any data loss. They can also be performed offline on other operating systems by booting the SmartStart CD and running the ACU.

Errors and Warnings

When you start the Array Configuration Utility, the software checks each controller to detect errors in its configuration. If a problem is found, the Array Configuration Utility displays an error or warning message that describes the problem. Error and warning messages include instructions to correct configurations. If a warning message indicates "lnternal Error Has Occurred" and cites an error code number, the problem requires assistance from Compaq technical support. See "About This Guide" at the beginning of this book for technical support phone numbers.

Alternate Sources of the Array Configuration Utility

Accessing On-line

lf the server you are configuring is running under Windows NT or NetWare, you can install and run the configuration utility online.

Windows NT

When you install the Windows NT Software Support Diskette (SSD), it prompts you to insert the second Array Configuration Utility diskette to install the utility. A program icon is created automatically. Select the icon to run the Array Configuration Utility. The Windows NT online Array Configuration Utility requires that at least one logical drive was previously configured while offline.

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NetWare

The Compaq Array Configuration Utility for NetWare (*CPQONLIN.NLM*), is available on the NetWare Support Software Diskettes (NSSD) in the \DRV_ARRY directory. Generate the NSSD diskettes using the Diskette Builder feature in SmartStart. The NSSD diskettes have an *ARRAY.RDM* readme file to access instructions on loading and using *CPQONLIN.NLM*.

SmartStart and Support Software CD

You can run the Array Configuration Utility directly from the SmartStart and Support Software CD.

1. Insert the SmartStart and Support Software CD in the CD drive and power up the server. A menu is displayed.
2. Select the Array Configuration Utility.
3. After completing the configuration, remove the CD and restart the server.

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Chapter 6

Server Configuration

Using Compaq SmartStart

SmartStart is the intelligent way to configure the server and to load the system software, thereby achieving a well-integrated server that ensures maximum dependability and supportability. To use the SmartStart and Support Software CD, refer to the Server Setup and Management pack. The first time the server is configured, the SmartStart program automatically creates a system partition and installs the Compaq System Configuration Utility and other Compaq utilities in that partition.

NOTE: Until you run the System Configuration program, an information message indicating that you are running with a default configuration will occur each time you boot the system. See "Powering Up Your Server" in Chapter 2 for more details.

To install the SmartStart and Support Software CD:

1. With your server turned on, locate the CD-ROM drive.
2. Push the button to release the tray. Pull the tray out.

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3. Place the SmartStart and Support Software CD in the tray (label facing up), handling the CD from the edges, not by the flat surfaces of the disc.

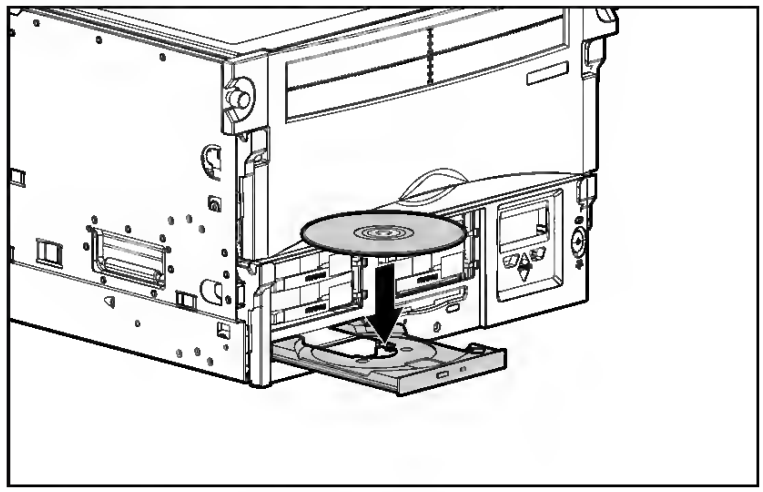

Figure 6-1. Installing a CD in the CD-ROM drive

When the CD-ROM busy indicator is lit, the SmartStart installation sequence begins.

To configure the system and load the operating system, refer to the SmartStart documentation provided in the Server Setup and Management pack shipped with your server.

To manage the system, refer to the Compaq Management CD provided in the Server Setup and Management pack shipped with your server.

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Chapter 7

Integrated Management Log

The Compaq Integrated Management Log records system events and stores them in an easily viewable form. The Integrated Management Log provides greater serviceability to your Compaq server by being capable of recording hundreds of events when service is required. It also marks each event with a time-stamp with one-minute granularity.

Events listed in the Integrated Management Log are categorized as one of four event severity levels:

- Status/Informational—indicates that the message is informational only.
- Repaired—indicates that corrective action has been taken.
- Caution—indicates a non-fatal error condition.
- Critical—indicates a component failure.

The Integrated Management Log requires Compaq Operating System-dependent drivers for full support. Refer to the Compaq Support Software CD for instructions on installing the appropriate drivers.

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Multiple Ways of Viewing the Log

You can view an event in the Integrated Management Log in four ways:

- From the Integrated Management Display (IMD)
- From within Compaq Insight Manager
- From within Compaq Survey Utility
- From on-line operating system utilities

NOTE: You can only **view** the event list on the Integrated Management Display; you cannot print it. Also, events are shown in a shorter form on the display than in Compaq Insight Manager.

Integrated Management Display

The Compaq Integrated Management Display (IMD) is an integrated, 16x4 character display mounted on the front of the server. This display provides easy-to-use, menu-driven access to server information. The following sections provide information on navigating and using the menus.

Configuring the Integrated Management Display

The Compaq Integrated Management Display can be configured to display a variety of menus that you can customize to meet your specific needs. This section provides information on how to configure and customize the Integrated Management Display.

Setup with the System Configuration Utility

After installing the hardware, you need to configure the Integrated Management Display using the System Configuration Utility located on the Compaq SmartStart and Support Software CD. We recommend that you use this version of the utility, because it is the latest one that supports your new Integrated Management Display.

NOTE: Some operating systems allow online configuration of the IMD. Refer to the Support Software CD for more information. The Windows NT utility to set up the IMD is called the Compaq IMD Utility.

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To run the System Configuration Utility:

1. Boot the computer from the Compaq SmartStart and Support Software CD.
2. From the Compaq System Utilities screen, select Run System Configuration Utility.
3. Select Continue.
4. Select Review or Modify Hardware Settings and press **Enter**.
5. Select *Step 3:* View or Edit Details and press **Enter.**
6. Scroll down until you find the section entitled Embedded Compaq IMD Module.
7. Highlight the field that you want to modify. You must press **Enter** to edit the highlighted item, then type the text for that field. After entering the text, press **Enter** to accept the modifications. Each field is discussed in detail later in this section. See "Customizing Management Display Fields."
8. Repeat step 7 for each menu item to be modified.
9. Press **F10** to exit the View or Edit Details screen.
10. Select Step 5: Save and Exit.

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11. At the server prompt Save the Configuration and Restart the Computer, select **OK=Enter**. The changes you have entered will not be displayed on the Display Panel until you reboot the computer. Standard Integrated Management Display fields are defined in the section "Navigating the Menus" later in this chapter.
12. If you have an older version of the System Configuration Utility installed on your hard drive, you will be asked if you would like to upgrade your system partition. You should upgrade your System Configuration Utility at this time.

Customizing Management Display Fields

You can customize many of the fields shown on the Integrated Management Display. The following sections define each of the menu choices and include examples of some fields.

Idle Screen Text

After the display has been idle for five minutes, the Integrated Management Display shows the following default screen text:

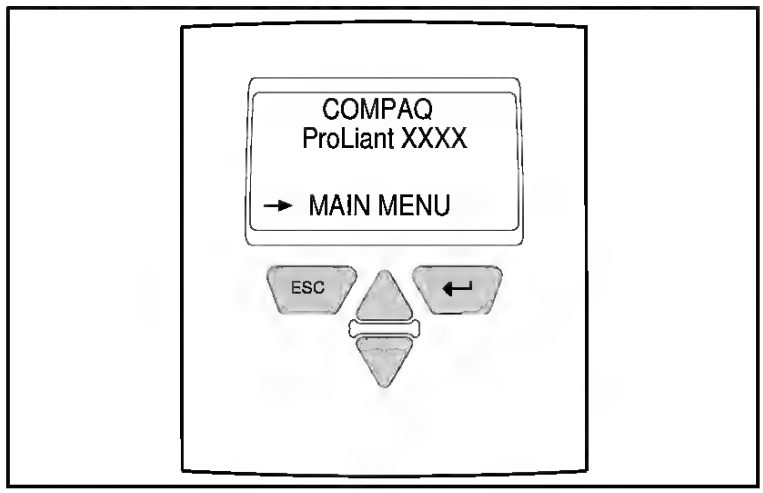

Figure 7-1. Idle screen text

You can change this text by entering up to 3 lines, with no more than 16 characters on each line. One suggestion would be to enter the server name here. This would allow an administrator to walk into a room with multiple servers and immediately locate the desired server.

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Another example might be to put the company name and slogan or goal, such as:

SMITH & ASSOC
OVER 1 BILLION
IN SALES 1999

Custom Menu Item

This is a user-defined field that can be used for customizing your server. This one-line field can hold up to 14 characters. If text is entered in this field, the text appears as another choice in the main menu.

Custom Menu Screen

This is a user-defined field that can be used for customizing your server. You can enter up to 4 lines of 14 characters each.

Server Information

Server Name

Enter up to 2 lines of no more than 14 characters each. An example might be to name the server by department, for example:

CUST SERVICE
WESTERN REGION

Asset Tag

Enter the server asset tag. Enter up to 2 lines of 16 characters each.

Primary Operating System

Enter the primary operating system of the server, for example, NT4.0. Enter up to 3 lines of 14 characters each.

Other

Enter any additional information about the server that might be helpful. This field can hold up to 2 lines of 14 characters each. For example, you might enter the server serial number in this field.

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Administrator Information

Name

This field contains the name of the system administrator. Enter up to 2 lines of no more than 14 characters each.

Phone Number

This field contains the phone number of the system administrator. Enter up to 2 lines of no more than 14 characters each.

Pager Number

This field contains the pager number of the system administrator. Enter up to 2 lines of no more than 14 characters each.

Other

This is a user-defined field. You can enter any additional administrator information. An example might be listing an additional administrator that serves as a backup to the primary administrator. Enter up to 2 lines of no more than 14 characters each.

Service Information

Name

This field contains the name of the service provider. Enter up to 2 lines of no more than 14 characters each.

Phone Number

This field contains the phone number of the service provider. Enter up to 2 lines of no more than 14 characters each.

Pager Number

This field contains the pager number of the service provider. Enter up to 2 lines of no more than 14 characters each.

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Other

This is a user-defined field. You can enter any additional service information. An example might be to enter service contract number. Enter up to 2 lines of no more than 14 characters each. For example, you might enter server history information such as:

```
SERVICE CONTRACT
1C2002
```

Standard Integrated Management Display Fields

In addition to the user-defined fields customized during configuration, the Integrated Management Display automatically provides the following standard fields:

System Information

Events

Selecting this menu choice enables you to scroll through a list of all error events starting with the most recent event.

ROM Date

This is the month/date/year of the current server ROM.

Bootblock Date

This is the month/date/year of the current server Bootblock.

Memory

This field shows the total memory of the server.

Processor Configuration

This field shows the processor speed and other details about the processor.

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F1 Prompt

Selecting this menu choice enables you to continue booting without a keyboard or monitor. This feature is useful for service and diagnostic purposes, allowing you to continue the boot up process without attaching a monitor and keyboard and their respective cables.

Contrast

You can adjust the level of contrast on the Integrated Display by using the up and down arrows. Press the **Up** arrow to increase the contrast, and press the **Down** arrow to decrease the contrast.

Navigating the Menus

The Compaq Integrated Management Display is menu-driven and easy to use. This section provides information on how to navigate and use the menus.

Normal Run-time Behavior

After configuring the display and rebooting the server, a series of server POST (Power-On Self-Test) operations appears. The first screen you will see after rebooting the server shows the model number and IMD firmware revision of your display, then the POST screen appears.

During POST, the display indicates that the server test is in progress by a spinning bar beside the menu item. When the test is finished, the Integrated Management Display shows a check mark by the completed menu item. A check mark tells you the test is complete, but does not necessarily mean the test was free from errors.

If an error occurs during POST, the server logs the error to the Integrated Management Display under Unviewed Events and requires you to view the error before proceeding to any other menu choices. If there are no errors, you will see the default idle screen text. See Figure 7-1, "Idle Screen Text." This screen could be different if you changed the text during configuration.

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Display Symbols

There are three different display symbols used to indicate your options as you scroll through the menus. These symbols are the Up, Down, and Selector arrows.

Table 7-1
Integrated Management Display Symbols

Type of Symbol	Symbol	Meaning
Right Arrow	→	Selector arrow shows current menu item. Press **Enter** on the IMD to select the menu item to the right of this arrow.
Up Arrow	↑	If present in upper right corner, indicates previous information exists. Press the Up Arrow on the IMD to view the information. Press and hold the button to scroll.
Down Arrow	↓	If present in lower right corner, indicates more information exists. Press the Down Arrow on the IMD to view the information. Press and hold the button to scroll.

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Navigation

To navigate through the menus, use the four buttons shown in the Figure 7-2. The Down and Up arrow keys (❷and ❸) allow you to move through the menu screens and choose menu items. The right button (❹) acts as an Enter key and allows you to travel down through the menus. The left button (❶) acts as an Escape key and allows you to travel back up the menu.

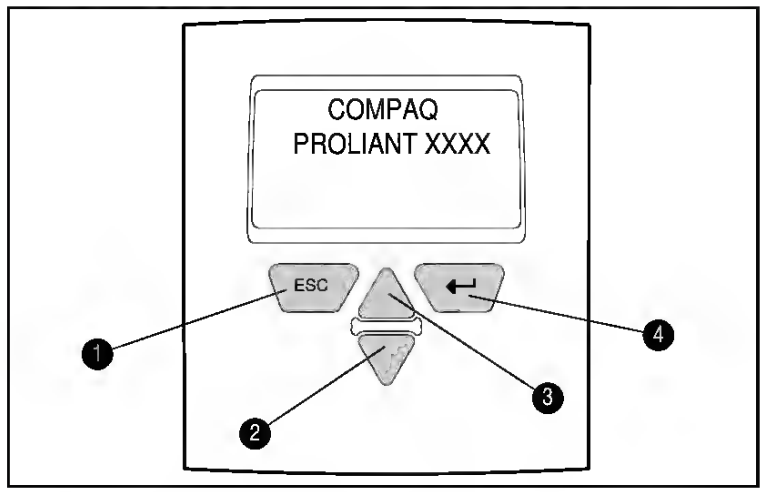

Figure 7-2. Integrated Management Display buttons

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System Behavior with Error Events

After system POST, if there is an F1 error condition the IMD flashes the message:

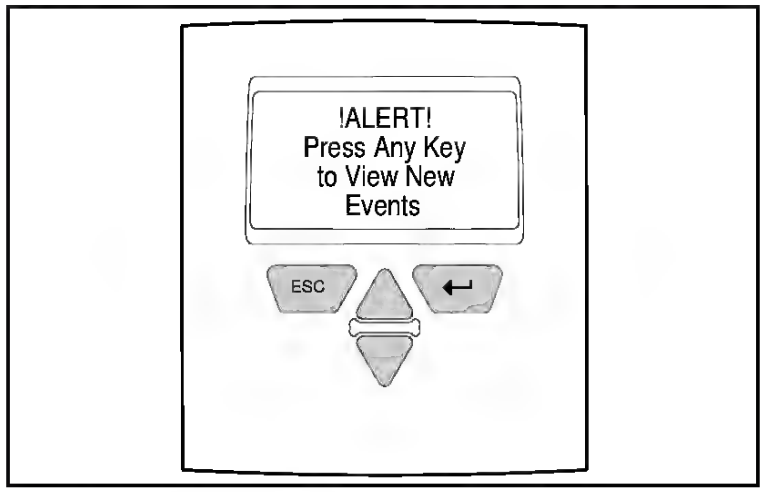

Figure 7-3. New event message

At this point, you must scroll through each screen of the event information menu before the IMD will allow you to move on to other menu choices. The display will not allow you to escape out of the Unviewed Events section until you have examined all of the information stored there.

After you have reviewed the events, you are able to proceed with normal display operation.

Menu Structure

The following outline shows the structure of each menu and submenu in the order in which it appears:

Events

- Event List

Administration Information

- Server
  - Server Name
  - Asset Tag

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- Operating System
- Other

- Administrator
  - Name
  - Phone
  - Pager
  - Other
- Service
  - Name
  - Phone
  - Pager
  - Other
- Custom Menu Item (if entered)
- Custom Menu Screen (if entered)

System Information

- ROM Date
- Bootblock Date
- Memory
- Processors

Contrast

- Contrast

Other Info

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Compaq Insight Manager

Compaq Insight Manager is a server management tool capable of in-depth fault, configuration, and performance monitoring of hundreds of Compaq servers from a single management console. System parameters that are monitored describe the status of all key server components.

By being able to view the events that may occur to these components, you can take immediate action. You can view and print the event list from within Insight Manager by following the instructions below. You can also mark a critical or caution event as repaired after the affected component has been replaced, for example, if a fan that has failed has been replaced. By marking it as repaired, you can lower the severity of the event.

Viewing the Event List

1. From Compaq Insight Manager, select the appropriate server then select View Device Data.
2. The selected server is displayed with buttons around its perimeter.
3. Select the Recovery button.
4. Select Integrated Management Log.

   NOTE: You can only view the list from the Recovery/Integrated Management Log screen. To print the list, follow the instructions in "Printing the Event List."

5. If a failed component has been replaced, select the event from the list then select Mark Repaired.

Printing the Event List

NOTE: You can only view the list from the Recovery/Integrated Management Log screen as described above. To print the list, follow the instructions below.

1. From the Insight Manager, select the appropriate server.

   The selected server is displayed with buttons around its perimeter.
2. Select the Configuration button.
3. Select the Recovery button.
4. Select Print.

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Compaq Survey Utility

The Compaq Survey Utility is a serviceability tool available for Windows NT and Novell NetWare that delivers online configuration capture and comparison to maximize server availability. It is available on the Compaq Management CD in the SmartStart package, or on the Compaq website at www.compaq.com. Refer to the Compaq Management CD for information on installing and running the Survey Utility.

After you have run the Survey Utility, you can view the Integrated Management Log by loading the output of the utility (typically called "survey.txt") into a text viewer such as Microsoft Notepad. The event list follows the system slot information. Once you have opened the text file, you can print it using the print feature of the viewer. For more information on the List of Events, refer to the *Compaq Servers Troubleshooting Guide* located on the Compaq Systems Reference Library CD or the *Compaq ProLiant 8500 Operations and Troubleshooting Guide* packed with your server.

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Chapter 8

Initial Startup and Troubleshooting

Powering on the Server

When you power on the server, it should go through the following sequence. Record any discrepancies and any error messages that appear.

1. Turn on power to the machine by pressing the momentary contact switch. The system LED should blink to indicate that the system is trying to power up. If the LED does not blink, when the power button is pressed, then either one of the system components is not properly installed, or there is no main power applied to the system power supplies.

   If the System LED is amber, check the System Interconnect Status Indicators, explained later in this chapter.

   If the System LED blinks once every 10-20 seconds, the system is trying to start, but may have a short. Refer to the "System Short" section in the Compaq Servers Troubleshooting Guide.

2. Check the power supplies. The following settings indicate that the power switch is on and the power supply is in a "power on" delay mode:

   - Top LED begins flashing (green)
   - Bottom LED ON (solid green)

3. If the power supply top LED does not begin flashing (the server will not power on), refer to the "System Interconnect Status Indicators" section later in this chapter.

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4. When the top LED turns solid green, listen for the fans to start.
5. The hard drive LEDs should blink. If the LEDs do not light, verify that the hard drives are fully installed in the system.

Check the following on the IMD.

1. Check for the IMD messages about the
   a. Server name
   b. LCD Firmware
   c. System Initialization
   d. PCI Auto Configuration
   e. Processors
2. Check the IMD Video message. If there is a monitor connected, you should see the Compaq initialization screen.
3. Check for the IMD memory test message. The monitor shows the memory count and the memory initialization.
4. Observe the memory count displayed.
5. Check for the IMD BIOS message. The monitor shows the number of processors, their speed, and their cache size.
6. Check for IMD messages about
   a. Drive Array
   b. Floppy Drive
   c. Option ROM
   d. SCSI device

Make sure each green LED on the PCI Hot Plug Interface Board is on (both inside and outside). To verify the inside LEDs, open the PCI Hot Plug access panel. If any LEDs are not on, power down the server. Check the following:

- Each slot has an expansion board or a slot cover.
- The slot release lever is closed.
- The expansion boards are properly seated. If necessary, try removing and reseating the boards to make sure.

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- The PCI Hot Plug Interface board cables are properly connected to the I/O board.
- The PCI Hot Plug Interface boards are properly seated on the chassis rear I/O panel.

System Interconnect Status Indicators

To prevent damage to critical system components, the ProLiant 8500 Server will not power up if it senses that certain components are not installed, or are installed incorrectly. The system interconnect status indicators provided with ProLiant 8500 Server provide a closed-loop checking mechanism for verifying proper component mating between critical server components. These indicators are located in the I/O Module in front of the system fans. They are operated using standby power provided by the power supplies.

If a light is on, reseat the component represented by the indicator. Labels next to the LEDs identify the component causing the problem. Refer to the hood labels for component location.

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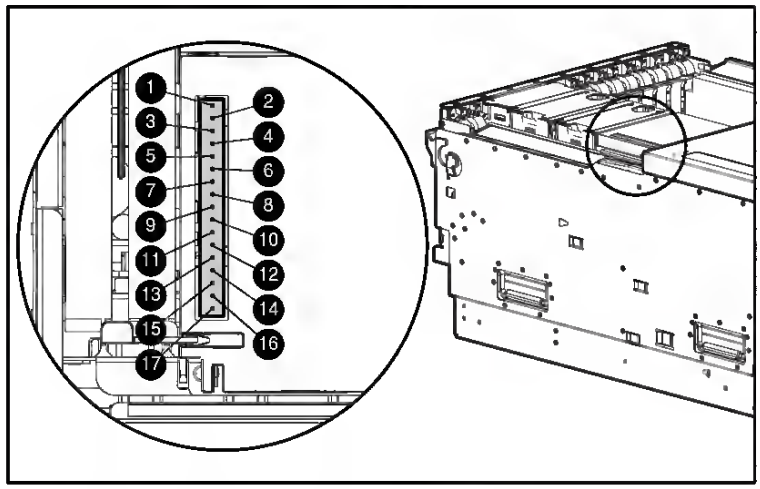

Figure 8-1. Accessing System Interconnect Status Indicator LEDs

Table 8-1
System Interconnect Status Indicators

Indicator	Component	Indicator	Component
❶	Emergency Shutdown[1]	❿	Termination PPM
❷	Processor 8	⓫	Memory
❸	Processor 7	⓬	Processor/Memory Module
❹	Processor 6	⓭	I/O Module
❺	Processor 5	⓮	Media Module
❻	Processor 4	⓯	SCSI backplane 1
❼	Processor 3	⓰	SCSI backplane 2
❽	Processor 2	⓱	System Reset[2]
❾	Processor 1		

Note 1: AC power to the system has been cut to avert imminent component damage and data loss. Reasons for this could include: the failure of the terminator PPM, the fan controller has stopped responding, or the system has recorded a temperature violation.
Note 2: A power supply has stopped providing adequate power as per system specifications, the system has experienced a short, a PPM has failed, or a reboot has been initiated via Automatic Server Recovery (ASR-2).

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IMPORTANT: To check System Interconnect Status Indicator LEDs, the server should be placed in Standby with the power supplies plugged in.

Running System Diagnostics

1. Make sure there is good facility power applied to the server.
2. With the power to the server still turned off, check the LEDs on the power supplies:
   - ❑ The top LED should be OFF (clear).
   - ❑ The bottom LED should be ON (solid green).
3. Turn on the power to the machine. During the Power-On Self-Test (POST), press **F10** to start the Compaq System Diagnostics.
4. At the Main Menu, select Diagnostics and Utilities.
5. At the Diagnostics and Utilities menu select Test Computer.
6. Select a test:
   - ❑ Quick Check runs a select set of tests. The time required for the test depends on the server configuration; it could require up to two hours. This test does require less time than the Automatic Diagnostics
   - ❑ Automatic Diagnostics runs a complete set of system tests. This test could require several hours.

If errors occur, refer to the "Diagnostics Tools" chapter of the Compaq Servers Troubleshooting Guide for details on other diagnostic options.

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Appendix A

Regulatory Compliance Notices

Regulatory Compliance Identification Numbers

For the purpose of regulatory compliance certifications and identification, your Compaq ProLiant 8500 server is assigned a Compaq Series Number. The Compaq Series number for this product is: Series ES2000. The Compaq ProLiant 8500 server Series Number can be found on the Regulatory Compliance label, along with the required approval markings and information. The Regulatory Compliance label is located on the top cover of the your server. When requesting certification information for this product always refer to this Series Number. This series number should not be confused with the marketing name or model number for your Compaq ProLiant 8500 server.

Federal Communications Commission Notice

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations has established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment.

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Class B devices are those that may reasonably be expected to be installed in a residential environment (i.e., personal computers). The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user.

The rating label on the device shows which class (A or B) the equipment falls into. Class B devices have a FCC logo or FCC ID on the label. Class A devices do not have an FCC logo or FCC ID on the label. Once the class of the device is determined, refer to the following corresponding statement.

Class A Equipment

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.

Declaration of Conformity for Products Marked with the FCC logo – United States Only

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions regarding your product, contact:

Compaq Computer Corporation
P. O. Box 692000, Mail Stop 530113
Houston, Texas 77269-2000

Or call 1-800- 652-6672 (1-800-OK COMPAQ). (For continuous quality improvement, calls may be recorded or monitored.)

For questions regarding this FCC declaration, contact:

Compaq Computer Corporation
P. O. Box 692000, Mail Stop 510101
Houston, Texas 77269-2000

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Or call (281) 514-3333.

To identify this product, refer to the Part, Series, or Model number found on the product.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Compaq Computer Corporation may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

Canadian Notice (Avis Canadien)

Class A Equipment

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Mouse Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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European Union Notice

Products with the CE Marking comply with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European Norms (in brackets are the equivalent international standards):

- EN55022 (CISPR 22) - Electromagnetic Interference
- EN50082-1 (IEC801-2, IEC801-3, IEC801-4) - Electromagnetic Immunity
- EN60950 (IEC950) - Product Safety

Japanese Notice

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Taiwanese Notice

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Laser Devices

All Compaq systems equipped with a laser device comply with safety standards, including International Electrotechnical Commission (IEC) 825. With specific regard to the laser, the equipment complies with laser product performance standards set by government agencies as a Class 1 laser product. The product does not emit hazardous light; the beam is totally enclosed during all modes of customer operation and maintenance.

Laser Safety Warnings

WARNING: To reduce the risk of exposure to hazardous radiation:

- Do not try to open the laser device enclosure. There are no user-serviceable components inside.
- Do not operate controls, make adjustments, or perform procedures to the laser device other than those specified herein.
- Allow only Compaq Authorized Service technicians to repair the laser device.

Compliance with CDRH Regulations

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 2, 1976. These regulations apply to laser products manufactured from August 1, 1976. Compliance is mandatory for products marketed in the United States.

Compliance with International Regulations

All Compaq systems equipped with laser devices comply with appropriate safety standards including IEC 825.

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Laser Product Label

The following label or equivalent is located on the surface of the Compaq supplied laser device.

This label indicates that the product is classified as a CLASS 1 LASER PRODUCT. This label appears on a laser device installed in your product.

Laser Information

Laser Type	Semiconductor GaAlAs
Wave Length	780 nm +/- 35 nm
Divergence Angle	53.5 degrees +/- 0.5 degrees
Output Power	Less than 0.2 mW or 10,869 $W \cdot m^{-2} sr^{-1}$
Polarization	Circular 0.25
Numerical Aperture	0.45 inches +/- 0.04 inches

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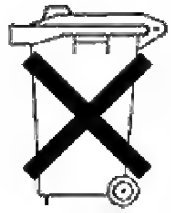
Battery Replacement Notice

Your computer is provided with a Lithium Manganese Dioxide, or a Vanadium Pentoxide, or an alkaline internal battery or battery pack. There is a danger of explosion and risk of personal injury if the battery is incorrectly replaced or mistreated. Replacement is to be done by a Compaq Authorized Service Provider using the Compaq spare designated for this product. For more information about battery replacement or proper disposal, contact your Compaq Authorized Reseller or your Authorized Service Provider.

WARNING: Your computer contains an internal Lithium Manganese Dioxide, or a Lithium Vanadium Pentoxide, or an alkaline battery pack. There is risk of fire and burns if the battery pack is not handled properly. To reduce the risk of personal injury,

- Do not attempt to recharge the battery
- Do not expose to temperatures higher than 60°C.
- Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
- Replace only with the Compaq spare designated for this product.



Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. In order to forward them to recycling or proper disposal, please use the public collection system or return them to Compaq, your authorized Compaq Partners, or their agents.

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Appendix B

Electrostatic Discharge

To prevent damaging the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

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Grounding Methods

There are several methods for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm ± 10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an Authorized Compaq Reseller install the part.

NOTE: For more information on static electricity, or assistance with product installation, contact your Authorized Compaq Reseller.

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Appendix C

Power Cord Set Requirements

The power cord set meets the requirements for use in the country where you purchased your equipment. The voltage selection switch allows you to select the appropriate line voltage for your server.

Power cord sets for use in other countries must meet the requirements of the country where you use the server. For more information on power cord set requirements, contact your Authorized Compaq Dealer.

General Requirements

The requirements listed below are applicable to all countries:

- The length of the power cord must be at least 6.0 feet (1.8 m) and a maximum of 12 feet (3.7 m).
- The power cord set must be approved by an acceptable accredited agency responsible for evaluation in the country where the power cord will be used.
- The power cord set must have a minimum current capacity and nominal voltage rating of 10 A/125 volts AC, or 10A/250 volts AC, as required by each country's power system.
- The appliance coupler must meet the mechanical configuration of an EN60320/IEC 320 Standard Sheet C13 Connector, for mating with the appliance outlet on the computer.

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Country-Specific Requirements

Use the following table to identify the appropriate accredited agency in your country.

Table C-1
Power Cord Set Requirements - By Country

Country	Accredited Agency	Applicable Note Numbers
Argentina	IRAM	1
Australia	EANSW	1
Austria	OVE	1
Belgium	CEBC	1
Canada	CSA	2
Chile	N/A	4
China	CCEE	5
Denmark	DEMKO	1
Finland	SETI	1
France	UTE	1
Germany	VDE	1
India	IS	7
Italy	IMQ	1
Japan	JIS	3
Korea	KIATECH	6
Norway	NEMKO	1

continued

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Table C-1
Power Cord Set Requirements - By Country *continued*

Country	Accredited Agency	Applicable Note Numbers
South Africa	SABS	7
Sweden	SEMKO	1
Switzerland	SEV	1
United Kingdom	BSI	1
United States	UL	2

Notes:

1. Flexible cord must be <HAR> Type HO5VV-F, 3-conductor, 1.0 mm^2 conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country where it will be used.
2. Flexible cord must be Type SJT or equivalent, No. 18 AWG, 3-conductor. Wall plug must be a two-pole grounding type with a NEMA 5-15P (15A, 125V).
3. Appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. Flexible cord must be Type VCT or VCTF, 3-conductor, 1.0 mm^2 conductor size. Wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7A, 125V) configuration.
4. Flexible cord must be Type SJT, No. 16 AWG, 3-conductor. Wall plug must be the 3 pin Italian style plug conforming to th4e CEI.23-16-VII standard.
5. Flexible cord must be Type RVV, 3-conductor, 1.0 mm^2 conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the CCEE certification mark.
6. The wall plug must bear a KIATECH mark. Flexible cord must be Type VCT or VCTF, 3-conductor, 1.0mm^2 conductor size. Wall plug must be a two-pole grounding type conforming to KSC 8305.
7. Flexible cord must be <HAR> Type HO5VV-F, 3-conductor, 1.0 mm^2 conductor size. The wall plug must be a two-pole grounding type conforming to BS 546, SABS 164-1 and IS 1293.

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Appendix D

Server Specifications

Table D-1
Compaq ProLiant 8500 Server Specifications

Dimensions		
Height	12.0 in	30.5 cm
Depth	27.0 in	68.5 cm
Width	17.5 in	44.5 cm
Weight (no drives and two power supplies)	111 lb	50.5 kg
Input Requirements (per power supply)	Low Range	High Range
Rated Input Voltage	100 to 120 V	200 to 240 V
Rated Input Frequency	50 to 60 Hz	50 to 60 Hz
Rated Input Current	8 A	10 A
Power Supply Output Power (per power supply)	Low Range	High Range
Rated Steady-State Power	500 W	1150 W
Maximum Peak Power	549 W	1150 W
Temperature Range		
Operating	50° to 95° F	10° to 35° C[1]
Shipping	-22° to 122° F	-30° to 60° C
Relative Humidity (noncondensing)		
Operating	10% to 90%	10% to 90%
Nonoperating	5% to 90%	5% to 90%
Maximum Wet Bulb Temperature	101.7° F	38.7° C

Note 1: Altitude derating: 1 °C/1000 ft to 10,000 feet.

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